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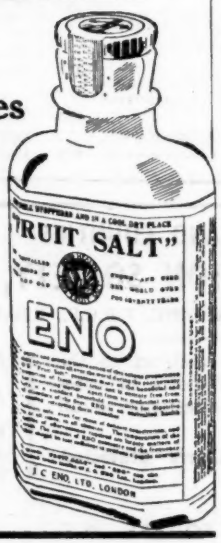

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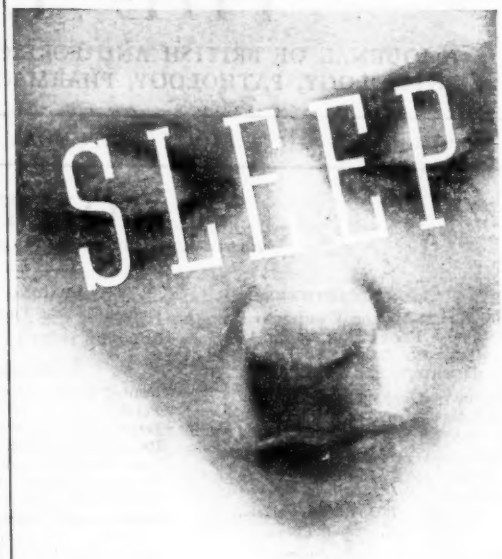

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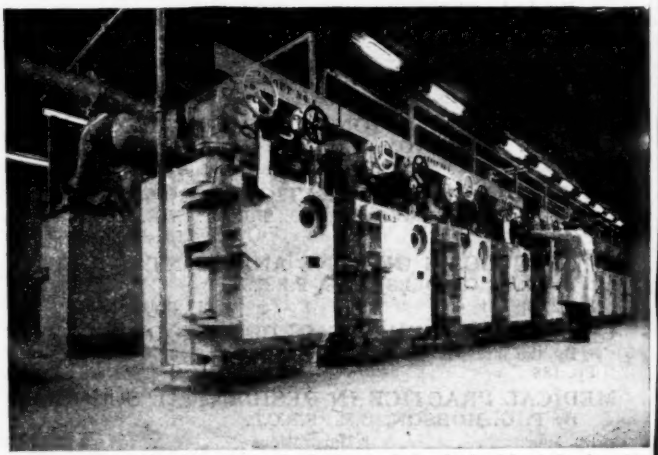

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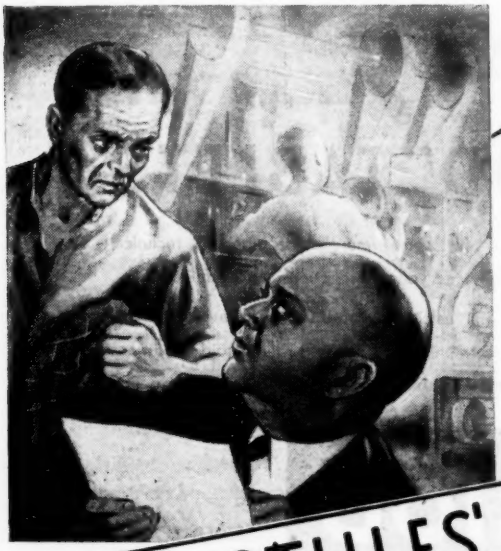

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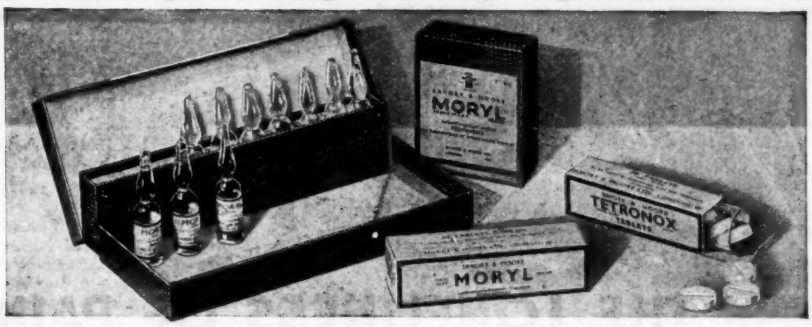

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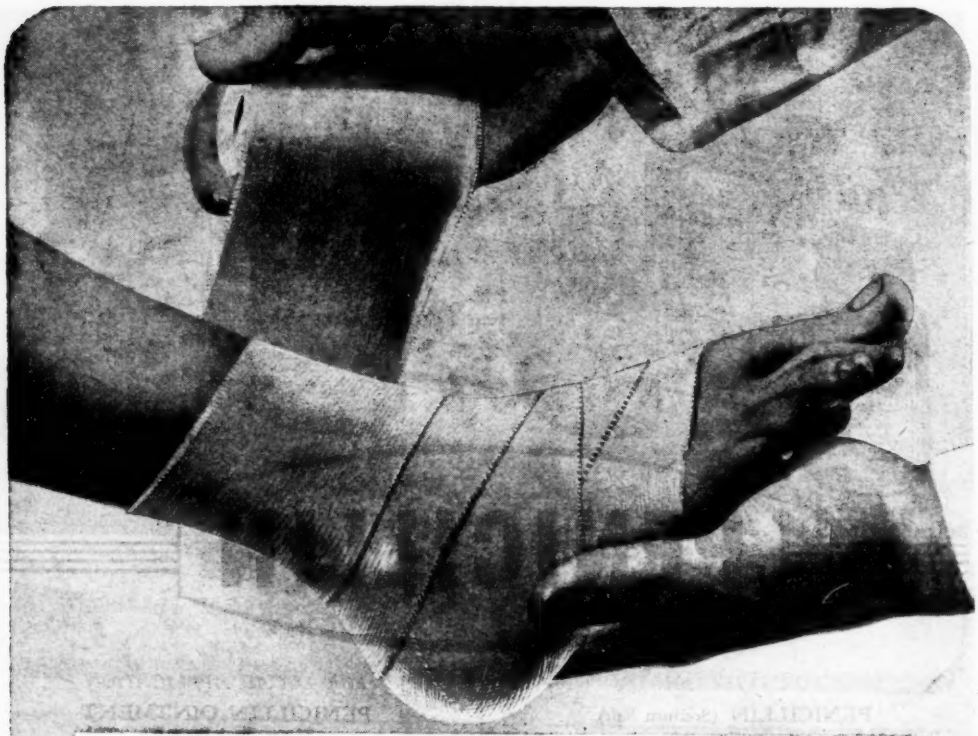

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THE routine prophylactic use, in severe battle casualties, of intramuscular doses of penicillin prompted an investigation into the penicillin content of wound exudates after 100,000 units, the recommended initial dose. It was hoped to determine whether such a dose would be followed by exudation of the drug into a wound, and whether it would remain longer there than in the blood-stream, thus exercising a protective effect during long periods in transit, in which no injections were given. When this time-limit was found, the same dose was placed locally in the wounds, and the duration of a protective concentration in blood and wound exudate following each method of administration was compared.

METHODS

Exudates were first collected from 22 lacerated wounds in airborne battle casualties at the first removal of dressings in the Radcliffe Penicillin Unit, and at different intervals following the immediate administration of 100,000 units of penicillin.

Owing to circumstances over which the Unit had no control, the supply of fresh cases ceased after three months, and so, as the experiments continued and the same wounds had to be used, the age of the latter increased until the last one was 67 days old. The immediate effects of trauma, therefore, could only have exerted an influence on the earlier results. Intramuscular administration was investigated before local when conditions more nearly approached those for which this method of prophylaxis had in fact been used.

Collection was usually by means of a Pasteur pipette, but a rubber drainage-tube was used on one occasion and a glass tube on five occasions. When collection took more than a few minutes, the collecting vessel was surrounded with ice.

Assays of blood and urine were also carried out to ascertain if there was any correlation between penicillin concentration in the three fluids.

The method of assay used for low concentrations either in the blood-stream or wound exudate was Heatley's drop-on-slide method (Garrod and Heatley 1944). For urine and wound exudate, when enough was collected and when the presence of more than 0·1 unit per c.cm. could be expected, the cylinder-plate method (Heatley 1944) was used. To make the test more delicate, the plates were seeded with a 1 : 1000 dilution of broth culture of the test staphylococcus (N.C.T.C. no. 6571).

Controls were obtained for wound-exudate samples by the addition of penicillinase or by using those collected so long after the last administration that they were free of penicillin.

Difficulties in Interpretation.—The reading of slide tests was made difficult in centrifuged exudates by the frequent presence of contaminating bacteria. To exclude false readings from inhibition of the test staphylococcus by the contaminants, a series of tests was set up in which serum was inoculated with the test staphylococcus and with one of six varieties of gram-negative bacteria cultured from the wounds. Various dilutions of suspensions of the contaminants were used for inoculation. Though they prevented the typical appearance of discrete colonies, microscopical examination always revealed a free though more diffuse growth of staphylococci in the presence of *Ps. pyocyanea* and *Bact. coli*. In the presence of proteus, growth though less abundant took place in every concentration used.

The greatest problem to be overcome, however, was the presence of some inhibitory factor, or factors, other than penicillin in the exudate. Nine wound exudates inhibited the test staphylococcus even when incubated with penicillinase; so their assays are excluded from the tables. Considerable efforts were made to eliminate this factor and to find its source. It was not produced by the gram-negative bacteria infesting nearly all the wounds, nor was it associated with rubber tubing or its preservative. Moreover, it appeared in a sterile serous exudate after it had been incubated for three hours.

Extraction.—Eventually a method of extraction was developed which ensured that penicillin alone was assayed. It depended on the use of ammonium sulphate, of high pH, to precipitate the globulins, and of amyl acetate and phosphate buffer for the actual extraction. To reduce penicillin loss, samples were kept, from the time of collection till the final extraction, in a beaker containing ice, only being removed when centrifuged or shaken. The method was as follows:

(1) The samples were centrifuged until a comparatively clear supernatant fluid appeared.
(2) This was removed with a pipette and diluted if necessary with saline, to make a minimum of 0·4 c.cm.
(3) Ammonium sulphate, equal by weight in grammes to half the volume in c.cm. of the sample from (2), was added and the mixture well shaken.
(4) It was centrifuged at 4500 rev. per min. for about 20 min. —i.e., until there was a sufficiency of clear supernatant fluid to use in the next steps.
(5) A volume of amyl acetate equal to that of an aliquot of the supernatant fluid was added.
(6) During gradual acidification to pH 2·0 with *N*/3 HCl † persistent shaking was carried out to prevent destruction by the acid before extraction had taken place.
(7) The supernatant amyl acetate was separated and removed.
(8) An equal volume of *M*/15 sterile phosphate buffer at pH 7 was added to the amyl acetate and shaken well.
(9) After centrifuging, the phosphate layer was removed for penicillin assay.

When slide tests were used, twofold dilutions were made with sterile serum. A fraction of serum was added to the first undiluted drop, as staphylococci did not grow in the phosphate buffer solution only. The lowest reading was equivalent to a little over 0·02 unit per c.cm. In the cylinder-plate test, undiluted buffer solution and tenfold dilutions were set up, so that, with the plates seeded with a 1/1000 dilution of the test culture, the lowest reading obtainable was 0·1 unit.

PENICILLIN LEVELS FOLLOWING INTRAMUSCULAR INJECTION OF 100,000 UNITS

All cases had received some kind of prophylactic penicillin therapy in transit, but none had been given any in the 24 hours preceding each experiment, nor was the last dose greater than 50,000 units. In eight instances the assays were done on patients within the first week of wounding, but the wounds of the remainder were considerably older.

The results in 11 cases are recorded in table I. Though cases whose wound-exudate controls did not conform to the standard mentioned earlier are excluded, their blood and urinary assays served to confirm the findings in those described. It will be seen that, irrespective of the age, types of bacteria, or pH of the wound, in every case there was a detectable amount of penicillin in the exudate up to 8 hours after injection, which ranged, at the end of this time, from 0·02–0·32 unit per c.cm.

* With a personal grant from the Nuffield Provincial Hospitals Trust.

† An excess of phosphoric acid would probably have been better.

After 12 hours it was still present in 50% of the exudates tested, but beyond this time there was considerable variability between results in different cases. It was noted that, though there were greater variation and prolongation in the duration of demonstrable inhibition in the blood-stream than has been commonly met with in cases treated with this dose (compare Fleming et al. 1944, McAdam et al. 1944, Child et al. 1945), there was a definite correlation between concentrations in the two fluids. Blood- and exudate-penicillin levels were similar at the end of the first hour after injection, but after this the blood-penicillin level fell more rapidly than the exudate-penicillin level—apart from one exception (case 1) there was no instance in which the blood-penicillin level after this time was higher than the exudate-penicillin level. Further, where an inhibitory concentration was prolonged in the blood, it was also prolonged in the exudate.

Urinary excretion of penicillin ranged from 30–50 units per c.cm. during the first 4 hours to 0·0–1·5 units per c.cm. by the end of 24 hours. The 4-hour concentrations were associated with penicillin levels of 0·04–0·08 unit per c.cm. in the blood-stream and 0·16–0·32 unit per c.cm. in the wound exudate. It therefore seems that the penicillin disappears from body fluids after intramuscular injection in the following chronological order: blood, wound exudate, urine.

Possible Factors Influencing Penicillin Assay.—These are discussed here as they apply more particularly to the intramuscular series, for spilling was a larger factor in the local series than any other.

(1) *Blood-urea* estimations were made in each case within 24–48 hours of the assay experiment. In one case (case 2), with a clostridial infection in which inhibition persisted for 24 hours in the exudate and for 12 in the blood, the reading was 360 mg. per 100 c.cm. In the only other case (case 4) in the intramuscular series whose blood-urea could be considered high there was no prolongation of inhibition in the wound beyond 8 hours or in the blood-stream beyond 4. In this case, however, the blood-urea only reached 46 mg. per 100 c.cm. Reduced excretion, as indicated by retention of metabolic products, may have played a part in retaining penicillin in these particular cases but does not appear to have affected the others.

(2) The *pH* of the exudates was tested in four of this series and in nine of those treated by local instillation. In one of these it was 8·0–8·4 (case 1). This was one of the only two (cases 1 and 5) in which the serous character of the exudate might have influenced the penicillin content (Bigger 1944). Inhibition was recorded in the undiluted exudate alone after 8 hours in spite of the fact that the blood continued to show inhibition at a dilution of 1 in 4 at this period. The remaining exudates were mainly thin, turbid, and darkly stained with blood, with various amounts of deposit, only two being purulent, and the eleven tested were within a pH of 6·0–7·5. Destruction of penicillin from this cause therefore should have been minimal.

(3) *Bacteria* were looked for in all the wounds. In the intramuscular series gram-negative organisms were present in eight and coliforms in five. Four exudates which contained coliforms, besides proteus and clostridia, *Staph. albus*, and non-hæmolytic streptococci in one or another, were assayed at various intervals after known amounts of penicillin had been added to them in vitro. One, containing initially 1·0 unit per c.cm. and assayed by the cylinder-plate test, sustained a loss at room temperature of 0·25 unit per c.cm. in an hour and of the whole penicillin content after 9 hours. At 37° C the penicillin completely disappeared within 4 hours. Two others had lost more than 0·3 of their original 0·4 unit per c.cm. within 15 min. at room temperature, and the fourth, assayed by the slide test and containing initially 0·2 unit per c.cm., within 2 hours had lost 0·03 unit per c.cm. at 4° C and 0·16 unit per c.cm. at 37° C. Thus, these exudates, which contained various organisms—the one in common being *Bact. coli*—showed a considerable and rapid loss of penicillin. As a control, a sterile serous wound exudate with a concentration of 0·02 unit per c.cm. was set up. It lost no activity when kept for 24 hours at 4° C, but, on incubation at 37° C without penicillin, it produced another inhibitory factor thus vitiating the comparison.

(4) *Effect of Extraction.*—Eight experiments were made, either by adding known amounts of penicillin in vitro or by injection into patients and comparing the assays of the merely centrifuged and the extracted exudates by cylinder-plate or slide test. They showed that little penicillin was lost during the extraction, and that in some cases an extract would give a value when the merely centrifuged exudate gave either an erroneous one or none at all.

TABLE I—PENICILLIN LEVELS AFTER INTRAMUSCULAR INJECTION OF 100,000 UNITS IN 11 WOUNDS

Wound no.	Age of wound (days)	Bacteria in wound						pH	Wound exudate (slide tests)													Urine (cylinder-plate tests)				Blood
									Controls' inhibition		Units per c.cm. at hours after injection															
		Bact. coli	*Ps. pyocyanea*	Proteus	*Staph. aureus*	Streptococcus	Clostridium		Before injection	With penicillinase	1*	2	3	4	5	6	7	8	12	16	20	24	12	20	24	28	Duration of inhibition (hr.)
1 (C)	4	−	−	−	−	−	−	8·4	0	0	+	+	+	0·16	+	+	+	0·02	0	0	0	0	7	4	0·5	0	8
2 (C)	6	+	−	−	−	−	+	..	..	0	2·56	+	+	+	+	+	0·32	+	+	+	0·02	0·02	..	..	..	..	12
3 (C)	6	+	−	−	−	Vir	+	..	..	0	0·32	+	+	0·32	+	0·16	+	0·32	+	0·08	..	..	..	..	..	..	..
4 (C)	6	−	−	−	+	−	−	..	..	0	+	+	+	0·02	+	+	+	0·02	..	..	..	..	..	>1	>1	..	4
5 (C)	7	−	−	−	−	Vir	+	..	..	0	>0·64	+	+	0·16	+	+	+	0·16	..	..	0†	−	..	..	..	..	..
6 (C)	8	−	+	−	+	−	+	7·5	0·02	0	+	+	>0·04	+	+	+	+	0·16	0·16	0·08	0·04	0·02	25	..	0	..	8
7 (C)	20	!	..	+	−	−	−	..	..	0	+	+	0·32	+	+	0·16	..	..	0†	−	−	0†	..	..	..	..	6
8 (E)	11	+	+	+	−	−	+	6·0	0	..	+	+	+	+	+	+	+	0·02	0·02	0	0	−	>1	0·02	0	..	7
9 (E)	40	−	+	+	−	−	−	..	0	..	+	+	+	+	+	+	+	0·04	0	−	−	−	..	..	..	..	<5
10 (E)	40	+	−	+	+	NH	−	..	0	0	+	+	+	+	+	0·08	+	+	0·04	0·02	..	0	..	..	..	..	..
10 (E)	61	+	+	+	−	−	−	6·0	..	..	0·04	+	0·64	+	+	0·16	..	..	0	−	−	−	..	..	..	..	..
11 (C)	32	+	+	−	−	NH	−	..	0·02	0	+	+	0·08	+	+	0·08	..	..	..	..	..	..	1·4	+	0·4	..	..

For purposes of comparison with table II, inhibition is recorded in units on the assumption that complete inhibition in undiluted slide tests =0·02 unit per c.cm. In tables I and II, + or − in assay columns indicates the presumed presence or absence of inhibition.

(C), exudate centrifuged only.
(E), exudate extracted.
Vir, *viridans*.
NH, non-hæmolytic.
* Samples taken at any time within the first hour.
† 0 at dilution of 1 in 2.

TABLE II—PENICILLIN LEVELS AFTER LOCAL INSTILLATION OF 100,000 UNITS IN 8 WOUNDS

Wound no.	Age of wound (days)	Bacteria in wound							pH	Cubic capacity of wound (c.cm.)	Wound exudate (cylinder-plate tests)							Urine (cylinder-plate tests)					Blood
		Bact. coli	*Ps. pyocyanea*	Proteus	Staphylococcus	Streptococcus	Clostridium	Others			Control before instillation (units/c.cm.)	Units per c.cm. at hours after instillation											Duration of inhibition (slide cell) (hr.)
												0*	18	24	48	60	72	18	24	48	60	72	
12 (E)	9	+	+	−	−	−	+	−	..	5	<0·5	20,000	+	+	500	..	..	..	..	0	..	..	5
	11	+	+	−	−	NH	−	−	5·8	5	..	20,000	+	+	+	+	2000	+	+	+	+	0·25	..
13 (E)	12	+	+	−	−	NH	−	−	6·8	3	..	33,000	..	..	..	..	..	+	2·0	..	..	..	4
	13	..	..	..	..	..	..	..	6·4	5	..	20,000	+	+	+	100	..	+	+	+	0·25	..	..
	16	..	..	..	..	..	..	..	..	5	..	20,000	+	+	+	+	500	..	..	..	..	0	..
14 (C)	17	+	+	−	−	−	−	−	..	6	0	16,600	+	10	..	..	..	+	2·0	..	..	..	0†
8 (E)	18	+	+	+	−	−	−	−	6·4	5	..	20,000	+	100	..	..	..	+	0·5	..	..	..	8
	19	..	..	..	..	..	..	..	..	..	..	20,000	+	+	+	1	..	..	..	0	0	..	..
	23	..	..	..	..	..	..	..	..	..	..	20,000	..	..	..	..	0	..	..	..	..	0	..
6 (E)	22	+	−	−	−	−	−	−	6·8	6	..	16,600	+	10	..	..	..	+	1·5	..	..	..	9
	23	..	..	..	..	..	..	..	6·2	..	..	..	..	..	..	0	−	..	..	..	0	..	..
9 (E)	27	−	+	+	−	NH	NH	−	6·6	5	<0·5	20,000	+	+	1·5	..	..	+	+	1	..	..	7
15 (C)	52	−	+	+	..	NH	..	Mes	..	3	..	33,300	>1000	..	..	..	..	10	..	..	..	..	..
(E)	56	−	+	−	−	−	−	Mes	6·7	1·5	0	66,600	+	>1000	>10	..	..	+	0·5	..	..	..	>6
(E)	67	+	+	+	−	−	NH	−	6·6	1	0·25	66,600‡	+	+	..	..	0	..	..	..	..	0	5
10 (E)	68	+	+	+	−	NH	−	−	..	6	..	16,600	..	..	..	..	..	1·0	0·8	..	..	..	9

(E), exudate extracted.
(C), exudate centrifuged only.
NH, non-hæmolytic.
Mes, *B. mesentericus.*

* Units per c.cm. before instillation.
† On another occasion inhibition present for 5 hours.
‡ Only 66,000 units retained in wound.

PENICILLIN LEVELS AFTER LOCAL INSTILLATION OF 100,000 UNITS

Experiments were made on eight separate wounds, none less than 9 days old, and seven infected with *Bact. coli*. A mild pyrexia was present in five cases, all had had previous courses of intramuscular penicillin, and those whose control exudates showed a small ring of inhibition had had local applications 24–48 hours previously. The wound was first cleaned with saline, and then a solution of penicillin was inserted, the amount varying with the cubic capacity of the wound. Spilling and leakage was inevitable in open wounds during the subsequent period of observation, thus explaining variation in results in the same wound. Assays were made by the cylinder-plate method (table II). The extraction method was used in seven cases. Only one reading was taken in each experiment, as the quantity of fluid required for this test necessitated the emptying of the wound when each sample was taken. A fresh instillation of penicillin for each assay was consequently required. As it was known that the original content of the wound was of the order of 25,000 units per c.cm., the cubic capacity of the wounds being 6 c.cm. or less, it was not considered necessary to make early assays. The duration of a detectable concentration of penicillin was the main point at issue, and it will be seen that in all cases this was for the blood at least 4 hours, for the urine 24, and for the exudate 48 hours. In 50% of cases tested the duration was extended to 6, 48, and 60–72 hours respectively.

Thus, in this series, the inhibition in the wound outlasted that in the urine by about 24 hours. These results were irrespective of the bacterial flora and the age of the wound after 9 days; the pH should not have affected the penicillin content; and in no patient was the blood-urea over 53 mg. per 100 c.cm. A comparison of the duration of inhibitory levels of penicillin by the two methods of administration are set out in table III. It is seen that, though there is very little difference in the duration of a detectable amount of penicillin in the blood-stream, the enormously higher local concentrations from instillation into the wound led to a very much greater duration of inhibition in both urine and wound exudate.

In an attempt to find the amount and frequency of dosage necessary to ensure continuous bacteriostasis in the blood-stream, smaller doses were placed in what suitable wounds still remained to us. Even 33,000 units produced a demonstrable though not necessarily complete inhibitory level in the blood for 5–9 hours. Using this as a basis it should be possible to maintain a constant inhibitory level in the blood by regular instillations of 33,000 units or more.

DISCUSSION AND CLINICAL APPLICATION

The study of these exudates demonstrates the difficulty of reliable assay of penicillin in such fluids. The presence of natural inhibitory factors in pus was demonstrated by Wright et al. (1918). Inhibition has been found by us also in infected pleural exudates and in one instance in a sterile wound exudate after incubation, and by McAdam et al. (1945) in cerebrospinal, peritoneal, and joint fluids. Therefore, before an attempt is made to assay any type of effusion or to estimate its content of penicillin, this source of confusion must be excluded. Extraction provides the best method of doing this, but it lengthens the process of assay considerably. Perhaps the most practicable method would be to control every assay of an exudate by setting up another with penicillinase, and to adopt the more tedious process only if the control shows inhibition.

The most curious anomaly in dealing with these infected exudates was the apparently rapid destruction of penicillin

TABLE III—COMPARISON OF INHIBITION AFTER INTRAMUSCULAR AND LOCAL ADMINISTRATION OF 100,000 UNITS OF PENICILLIN

Source of samples		Minimal duration of detectable penicillin (hr.)	
		Intramuscular	Local
Blood	In all cases tested ..	4	4
	„ 50% „ „ ..	7	6
Urine	In all cases tested ..	20	24
	„ 50% „ „ ..	24	48
Wound exudate	In all cases tested ..	8	48
	„ 50% „ „ ..	12	60–72
Range of concentrations detected in wound exudates (units per c.cm.)		2·56–0·02	2000–1·0*

* All at 18 hours or more from instillation.

when added to them in vitro and yet its long persistence in the wounds. Possibly in the case of intramuscular injection a continual leakage into the wound from the surrounding tissues might explain its presence, whereas the enormous concentrations used in local instillations would not be significantly reduced by the destruction of several units per hour. Further possibilities are that the rate of destruction varies with the concentration of penicillin, or that adsorption takes place when penicillin is first added to an exudate, with the result that its presence is not demonstrated by the cylinder-plate test. The fact that some penicillin persisted (as shown by the controls) even after an intramuscular course, or the usual local applications of 250 units per c.cm., had been discontinued 24 hours previously, showed its ability to withstand total destruction. Whatever the explanation, the assays appear to be an answer to the fears expressed by some—e.g., Meleney et al. (1946)—that penicillinase-producing bacteria would neutralise the effect of the drug in a wound.

A concentration of 0·02 unit per c.cm. was adopted as the lowest protective concentration; but, though adequate against most staphylococcal and streptococcal invasions, it might be low for clostridial infection. If, however, as Ross (1946) has noted, inhibition of relatively resistant strains depends on the size of the inoculum, then, at an early stage after wounding, when multiplication of bacteria cannot have progressed far, such a concentration should have some effect, for, according to his slide-cell tests, this concentration in circulating serum led to partial inhibition of *Cl. welchii*. Intramuscular injections of 100,000 units produced higher concentrations and complete inhibition for $1^1/_2$–3 hours, depending on the strain used. It can therefore be stated that intramuscular injection of 100,000 units leads to the exudation of a useful level of penicillin into the wound which is reabsorbed more slowly so that protection lasts several hours longer than is indicated by the level of circulating penicillin. Though the results recorded here indicate that, with the dose used, reliance could not be placed on a longer period of inhibition than 8 hours, yet none of these cases was examined during the first 24 hours of wounding, when metabolic disturbances and diminished urinary excretion following severe trauma would favour the retention of the drug within the body. Case 2, with fractures of femur, tibia, and fibula, with much laceration of muscles of the leg and back, *Cl. welchii* in his wounds, a blood-urea of 360 mg. per 100 c.cm., and no excision of his leg wound for 9 days, should have produced very favourable conditions for the development of gas gangrene. Yet inhibition and therefore protection in his case was more prolonged both in blood and wound than in any less severely injured case.

Further application to therapeutic fields may be permissible. If the prolonged presence of penicillin in wound exudates indicates its presence in any inflammatory tissue exudation, a ready explanation is found of the remarkably good results obtained by a course of once-daily injections of aqueous solutions in early syphilis (Jones et al. 1946), and of twice-daily injections in acute inflammatory conditions (Bedford 1946) and in gonorrhœa (Cohen and Grover 1945). It may therefore be feasible to treat purely focal infections by a reduced number of injections per 24 hours—e.g., once or twice—while increasing each individual dose to 100,000 units or more without recourse to vehicles, such as beeswax and peanut-oil, which delay absorption (Romansky and Rittman 1945). Certainly the fears expressed by Rammelkamp and Kirby (1945) of the danger of this type of treatment do not appear to have experimental foundation.

In wounds treated locally, not only the duration of protection but also the concentrations of penicillin make a striking contrast to those treated by intramuscular injection. It might be argued that the assay of the fluid in these wounds was not a true index of the concentration in the tissues of their walls; but, as inhibitory concentrations were detected in the circulating blood for as long as after intramuscular injection, and in the urine for at least twice as long, clear proof was given that absorption took place. The necessity of collecting a sufficient amount of exudate for each assay impelled the use of a solution, but for practical purposes it is obvious that, failing complete suture, full retention of a fluid preparation would always be problematical. This disadvantage can be largely overcome by using a solid preparation—powder or tablet. The extraordinary solubility and absorbability of penicillin by body fluids renders it an ideal local chemotherapeutic agent. Those who have used penicillin powder, unmingled with a sulphonamide, in wounds know how rapidly it is dissolved and absorbed, though some exudation invariably accompanies its insertion. So small an area as 1 sq. in. will absorb 1 g. within a few minutes. Wherever hæmostasis can be secured, there is no question therefore that local implantation of the drug in a wound will afford surer protection than any practicable intramuscular dose.

One other point of clinical application emerges from this study. After intramuscular injection the disappearance of penicillin from the urine succeeded its disappearance from the exudate, but in the case of local application it preceded it. Where wounds need to be enclosed in plaster, tests of the urine will indicate the presence of penicillin placed in the wounds, with a 24-hour margin of safety.

The recommendation of intramuscular treatment as the routine method of administration of the drug to battle casualties, together with the ample supplies of penicillin available between D-day and the end of the war, seems to have encouraged the idea among surgeons that this is the route of choice for administration. The discipline of troops has enabled this method of treatment to be carried out effectively and often for a long time. Though the findings in this paper or the use of vehicles delaying absorption may enable fewer injections to be used, and though oral administration may become practicable (Finland et al. 1945, Ross et al. 1945), yet these methods cannot produce concentrations of the drug comparable with those of local administration at the focus of infection. To those who have practised and seen the results of local administration, only using the intramuscular route when inaccessibility of the lesion necessitates it, it has long been obvious that, used advisedly and repeated at suitable intervals, it not only avoids the very undesirable effects of discomfort or even pain to the patient and disturbance of his rest, but that it can accomplish the desired results, both local and systemic, wherever a wound can be so sufficiently closed either by suture or dressings as to retain the drug.

SUMMARY

A method for preparing wound exudates for assay of their penicillin content is described.

Sources of error from other inhibitory factors and from contaminating bacteria are thereby eliminated.

A dose of 100,000 units given intramuscularly to severely injured battle casualties whose wounds were 4–61 days old invariably produced inhibition for 8 hours in the wounds tested, and for 12 hours in 50% of cases.

A dose of 100,000 units given locally into wounds 9–67 days old invariably produced inhibition for 48 hours in the wounds tested, and for 60–72 hours in 50% of cases.

These time-limits were irrespective of the age, bacterial flora, pH, or consistence of the wound exudates.

Blood and urine assays were correlated with these findings and served to confirm them.

A possible application of these findings to the treatment of focal infections is mentioned.

The advantages of local over intramuscular administration in prophylaxis and treatment are also discussed.

We are particularly indebted to Dr. N. G. Heatley for invaluable advice throughout and for carrying out some experiments; Dr. J. Humphrey for suggesting the use of ammonium sulphate in the process of extraction; Lieut.-Colonel J. S. Jeffrey for allowing us to do the work on his cases; Private P. Bowdery for technical assistance; and Dr. R. W. N. L. Ross for some final blood assays.

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CORONARY OCCLUSION IN YOUNG ADULTS

REVIEW OF FIFTY CASES IN THE SERVICES

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ALTHOUGH the last twenty years have seen a rapid development in the clinical diagnosis of coronary occlusion, it is still considered to be very rare in young adults. A considerable number of cases in patients under the age of forty years have been recorded in the literature, although most of the authors describe only 1 or 2 such cases individually.

Smith and Bartels (1932), in reporting 2 cases in patients aged thirty-five and thirty-six, state that they were able to find in the literature up to 1932 only 20 proved cases of coronary thrombosis affecting patients under forty years of age. Since then many more cases have been recorded.

Durant (1937) reports 7 cases in patients aged thirty-five years or under observed in a clinic in four years.

The most extensive series of cases has been recorded by Glendy et al. (1937), who reported 100 patients under forty years of age, collected from several hospitals and clinics in three years; of these only 8, however, were under thirty years of age.

French and Dock (1944) analysed the clinical and pathological features of 80 cases of coronary disease in American soldiers aged from twenty to thirty-six from data received at the American Army Medical Museum since the beginning of the recent war. The striking clinical feature was overweight (in 73 cases), and in every case arteriosclerosis was the basic lesion.

In view therefore of the apparent rarity of coronary thrombosis in young people, I have gone through the records of the Service men and women who have been invalided with, or died from, coronary occlusion or thrombosis, and collected the records of those up to the age of thirty-five for analysis. A careful attempt has been made to select only those cases where the diagnosis was beyond doubt—i.e., either proved by necropsy or where the electrocardiogram shows the characteristic changes of coronary occlusion in support of the clinical diagnosis. All doubtful cases have been excluded. I have collected records of 50 such cases which occurred during the recent war. The youngest patient was aged twenty, and no less than 22 of the 50 patients were in their twenties, although as shown below the frequency increases with age, as in the older age-groups:

Age in years	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
No. of cases	1	2	3	1	3	1	1	3	5	2	4	3	6	7	1	7
	7					8			14				21			
	15								35							

These figures show that coronary thrombosis in the young is not so uncommon as was formerly thought, and that it may occur at an early age. Of the 50 cases of coronary thrombosis the diagnosis was established clinically in 11 and by necropsy in 39.

SCOPE OF PRESENT STUDY

I have extracted from the Service documents all the available data that might have a bearing on the ætiology. None of the cases have been seen by me personally. Unfortunately all the information that one would have appreciated—such as family history, ancestral longevity, and habits, including tobacco consumption, &c.—was not recorded. On the other hand, every case was examined on entry into the Service, and in many cases several times subsequently; hence we have a record in every case of the subject's physical condition before the onset of the catastrophe. The occupation before entry into the Service has also been noted. The past illnesses, if any, and conditions of service are usually recorded; and the relation of physical stress to the onset can thus be deduced. The height and weight of the individual on entry is also usually recorded; hence the relation of body-build may also be considered.

CLINICAL FEATURES

Sex-incidence.—Coronary disease at the usual older periods is recognised as being more common in males; in the young age-group of Glendy et al. (1937) the proportion was 24 males to 1 female. In the present series there was only 1 female—a Wren aged 28. It must be remembered, however, that in the pool from which these cases were drawn there were about 10–15 males to 1 female. Even so, it appears that the disease is more common in males than in females in this younger age-group.

Body-build.—The striking feature was the good physical development and nourishment of these young adults. The recorded weight on entry into the Service in 43 of the 50 cases was over 126 lb. The highest weight was 193 lb., and many were over 150 lb. In 21 of the 39 necropsies remarks such as "well nourished," "powerfully built," and "obese" are made. The physical fitness of the subjects is indicated by the fact that 45 of the 50 were graded fit, or I, on entry. Even in the 5 exceptions the lowering of the category was due to some slight disability, such as flat-foot, defective vision, &c., entirely unconnected with the general physical development. The heart was recorded as normal in every case, including those in the lower category.

Previous Infection.—Rheumatic fever may cause proliferation and fibrosis of the elastic tissue of the coronary arteries, with necrosis resembling arteriosclerosis (Karsner and Bayless 1934). Further, acute rheumatic fever is known to cause changes in the electrocardiogram simulating coronary thrombosis. In the present series 3 persons gave a history of rheumatic fever, 2 of them having had the attack only two years before entry into the Service.

There were 2 cases with a history of scarlet fever, and in 1 of them, in which we have a detailed account of the necropsy findings, including histological examination, it appears that the scarlet fever may have been a causal factor in the pathology.

It is now generally recognised that chronic suppuration and infection extending over many years may lead to atheroma. In 1 case in this series the man sustained a gunshot wound of the arm, which necessitated prolonged hospital treatment owing to the formation of sequestra and to low-grade infection. He was discharged from the Service two years later with the wound healed but with albuminuria, and it was stated that he never felt well subsequently. He died two years after discharge from the Service, and necropsy showed "a striking degree of occlusion of one branch of the coronary artery, due to high-grade atheroma, which at this age is a gross abnormality." He was twenty-nine years of age.

It appears, then, that infection may be an ætiological factor in the production of coronary disease in young people.

Physical Strain.—Of the 50 persons, 23, or nearly half, were subjected to physical stress, the catastrophe occurring immediately after the stress in 11 cases and within a few days in the remainder. On the other hand, in 27 cases there was no evidence of any stress before the onset.

Pre-Service Occupation.—Only 8 of the 46 pre-Service occupations recorded were sedentary. Of the non-sedentary occupations about half may be considered as heavy work.

Prognosis.—In the 50 cases there were 39 deaths, a very high mortality. What is equally striking in these young adults is that in 33 of the 39 deaths the persons were found dead or died almost immediately after a collapse. The longest survival period of the 6 exceptions was nine months. In contrast to the high immediate mortality in this series, Conner and Holt (1930) found an immediate mortality of 16·2% in 287 patients of all ages. Boyd (1944) states that less than 25% of patients die in the first attack. It is also noteworthy that practically all the sudden deaths were in apparently fit and healthy men who had previously carried out their military duties without any signs of cardiac distress, the disease being unsuspected during life and only diagnosed at necropsy.

Of the 11 patients still living several have resumed work, although pain on exertion and breathlessness are complained of. As most of the survival cases are of recent occurrence, the ultimate prognosis cannot yet be determined, but 1 patient has so far survived four years since the first attack (syphilis may have been a factor in this case). The only other patient with evidence of syphilis in the series had also resumed work. It may appear, therefore, that the prognosis in syphilitic cases treated appropriately is good, but in view of the small number of cases this is doubtful. In none of the 39 fatal cases was there any evidence of syphilis either clinically or at necropsy.

Necropsy Findings.—The left coronary artery is usually considered as being more frequently affected than the right. In the present series of 39 necropsies the right coronary artery was affected in 5 cases, the left in 17, and both were affected in 16 (no record in the remaining case).

Leary (1941) considers that in the younger age-group of coronary thrombosis (from twenty-two to forty-five) the pathological lesion is due to subendothelial fibrosis, with necrosis of the intima leading to thrombosis. Calcification, he states, does not occur in this group. In the older group (over forty-seven), on the other hand, the fibrotic process is absent and calcification is well marked; thrombus formation is not so common as in the younger group. The findings in this series of 39 necropsies do not support this view. Only 2 of the cases appear to conform to Leary's younger group, showing the fibrotic reaction without calcification. The remaining 37 appear to present the usual degenerative atheromatous changes met with in coronary disease of older people. In several cases extensive calcification of the coronary vessels is noted by the pathologist. Again, in 29 of the 39 cases no thrombus was found.

The heart was definitely stated to be enlarged in 20 cases. In 1 it was described as small. In 17 cases myocardial infarction was found, either recent or long-standing; in 1 case some of the infarcts appeared to be at least two years old.

DISCUSSION

This series of 50 cases of coronary disease in young adults demonstrates that degenerative changes of a remarkable degree can exist in the coronary arteries at an early age, and that coronary disease is not so rare as formerly thought. It is therefore no longer justifiable to disregard the possibility of coronary occlusion in a doubtful diagnosis owing to the youth of the patient. The individuals are usually in excellent health, of good physical development, and capable of exertion without any untoward effects. Clinical examination is usually negative, and there may be no subjective symptoms before the onset.

Whatever the ætiological factors, they appear to be more common in males. Body-build appears to be an important factor, as most of the subjects were powerfully built, robust, and often adipose. There is evidence that in some cases infections, such as rheumatic fever, scarlet fever, and chronic prolonged low-grade toxæmia, may play a part in the production of the pathological process in the coronary vessels. Atheromatous lesions have been found in children after acute infections. In the present series there were 3 cases with a history of rheumatic fever and 2 of scarlet fever; 1 case followed prolonged suppuration of a gunshot wound. Syphilis appears as infrequent a cause of coronary thrombosis in young people as in the older age-groups, there being only 2 cases in this series. Hypertension does not appear to be so important a factor in this young group as in later life. Only 3 cases showed any evidence of hypertension.

Only 8 of the 46 pre-Service occupations were sedentary and half of the subjects were doing heavy work before entry into the Service. One might deduce from these figures that sedentary workers suddenly called on to experience the stress of Service life were not more liable to coronary disease than manual workers; but, until the proportion of sedentary to manual workers in the Services is known, any inferences are premature and unsound.

The high mortality in this series indicates that the prognosis in the young is much worse than in the older age-groups. The immediate mortality is extremely high (33 cases of sudden death out of 39 fatal cases).

In view of the large proportion of sudden deaths in apparently healthy individuals, the necropsy findings are rather surprising. The absence of thrombus in most cases is unexpected. Again, the fact that in most cases the myocardial infarction was due to gradual occlusion of the coronary vessels by advanced atheroma, often with calcification, as occurs in the older age-groups, and indicating that the pathological process had been present for several years, is also surprising in view of the youth of the subjects.

SUMMARY

A review is given of 50 cases of coronary occlusion in young adults in the Services, the youngest being twenty years of age.

The subjects were of good physical development and previously fit condition.

Previous infection might have been of ætiological importance in only a few cases.

In more than half the cases there was no evidence of physical strain.

Sudden death took place in 33 out of 39 fatal cases.

At necropsy, 37 out of 39 cases showed the usual degenerative atheromatous changes found in coronary disease of older subjects, and in 29 there was no thrombus.

I wish to thank Sir Walter Haward, Director-General of Medical Services of the Ministry of Pensions, for his permission to publish this paper.

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DEFICIENCY DISEASES
IN PRISONERS-OF-WAR AT CHANGI, SINGAPORE
FEBRUARY, 1942, TO AUGUST, 1945

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SINGAPORE capitulated to the Japanese forces on Feb. 15, 1942. Of the troops captured, a proportion were in an exhausted condition, having fought through a strenuous campaign, but the majority had undergone relatively little hardship. In the week that followed the capitulation about 52,000 troops marched out from Singapore to Changi Camp—about sixteen miles—in the heat of the day. An outbreak of bacillary dysentery had begun at the time of capitulation, and the shortage of water and latrine accommodation in the prisoner-of-war camp rapidly resulted in an epidemic in which the morbidity-rate was high, but fortunately the disease was due to a mild Flexner infection and the mortality-rate under the circumstances was low.

GENERAL CONDITIONS

The prisoner-of-war camp was on Singapore Island, in open country near the sea-coast. During the first two years the area included in the perimeter wire was spacious and allowed considerable movement, but in the last eighteen months it was somewhat restricted. Throughout the whole time the housing was inadequate and this was particularly so in the last eighteen months. The peace-time civil prison was used for housing troops, and 4 men were made to occupy cells designed for 1 convict; this building, with its peace-time capacity of 600–700 prisoners, at times held 6000 men. There were never enough permanent buildings, and a large number of the troops were housed in leaf huts with earth floors. These were dark, damp, and impossible to keep clean.

The climate of Singapore is equatorial. The mean temperature is about 80° F, the mean maximum and minimum varying between 87° and 74° F, and the rainfall is about 100 inches a year. The temperature varies but little throughout the year and the rainfall is fairly evenly distributed. The climate must to some extent have offset the privations of the prisoners-of-war, for even when the calorie intake was relatively high they did not complain of the heat and during periods of low food intake they complained of the cold only when it rained.

Clothing was extremely scarce, especially latterly, and the men wore only a pair of shorts. They worked the whole day in this half-naked state and became a mahogany colour with sunburn.

During the first year the bacillary dysentery persisted, and about 80% of the personnel had one or more attacks. Throughout the remainder of the time the disease was always present and a number of minor outbreaks occurred. In the last year amœbic dysentery became increasingly common. In the first two years there was a relative freedom from malaria, but in the last eighteen months some 70% of the total population had one or more attacks.

THE DIET

The Japanese scale of rations for prisoners-of-war was as follows:

Rice	500 g.	Fresh vegetables ..	100 g.
Flour	50 g.	Canned milk ..	15 g.
Sugar	20 g.	Salt	10 g.
Cooking fat ..	5 g.	Tea	5 g.
Meat or fish ..	50 g.		

This scale was not maintained, as can be seen from table I. The details of the diets contained in this table were obtained by averaging the daily issues over a month. Where major changes occurred during the month they are shown.

For the first three years the daily issue of rice, or some substitute, was always more than 400 g. per man. In February, 1945, the first severe cut was made. Men on light duty—i.e., those who were not working for the Japanese or employed on hard work in the camp itself—were given only 325 g. per man per day. This was followed by further cuts, and in the last months of the camp rice was issued in daily amounts of 270, 225, and 180 g. to heavy-duty, light-duty, and no-duty personnel. Almost all the rice supplied was highly milled. The second item in the Japanese scale, a bleached flour, lasted only for the first seven months and did not reappear. The third item, sugar, was maintained at about the 20 g. level throughout the existence of the camp.

The amounts of meat and fish issued varied considerably. Fish was supplied more often than meat. Fresh fish was usually in the form of numerous species of small fish which were exceedingly bony and from which relatively little nourishment could be obtained. The dried fish was in the form of dried sprats (*Stolephorus* spp.), or partially dried and salted horse mackerel (*Caranx* spp.), or, much less frequently, larger dried fish which could not be identified.

Fresh vegetables were not supplied in the first few months, but thereafter sweet potatoes, yams, pumpkin, and cucumber were supplied on a scale exceeding that laid down. Green leaf vegetables in quantity appeared later.

The canned milk on the Japanese scale was supplied only for a little over two months. The last item, cooking fat, was supplied in much more generous amounts than laid down in the scale, except for the first few months.

The diet supplied by the Japanese was supplemented by various means throughout practically the whole period, although the supplements were at times very small. In the first six months or so canned goods, biscuits, &c., which had been brought into camp by our own troops, were issued by the supply depots on a regular scale, but these issues were so small that they were of relatively little value. In October, 1942, Red Cross supplies were brought into the camp and it was possible to supplement the diet very considerably over a period of two and a half months (see table II). In June, 1943, a levy on all money coming into the camp was instituted and the diet was supplemented by purchases of the foodstuffs shown in table I under the heading "Camp Messing Fund."

Estimated Food Value of Diet.—The details are shown in table III. In these calculations no allowance has been made for waste except in root vegetables, although during the periods when food was plentiful there was some waste of rice; in the lean periods waste was reduced to an absolute minimum.

The daily calorie intake in March and April, 1942, was about the 2100 level. It increased slowly, and by August, 1942, had risen to 2500 calories. From then till the end of the third year of imprisonment—i.e., February, 1945—it was usually above the 2500 level.

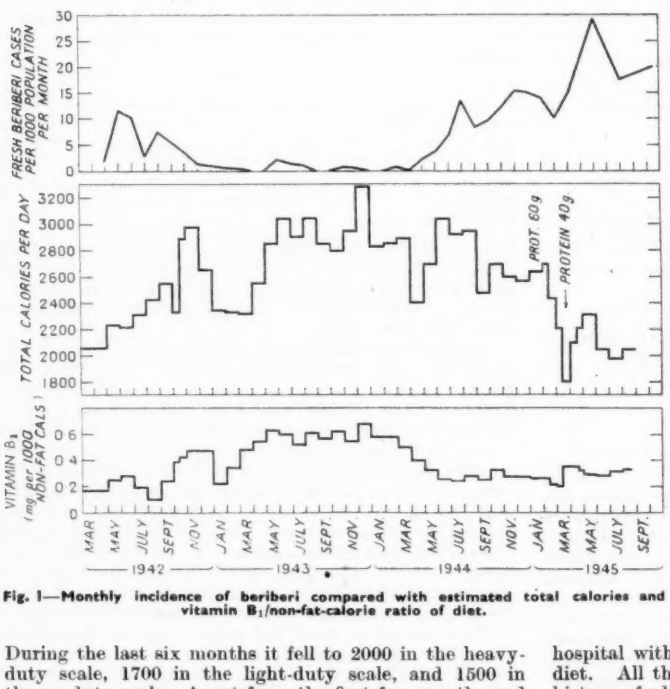
FRESH BERIBERI CASES PER 1000 POPULATION PER MONTH
TOTAL CALORIES PER DAY
PROT. 60g
PROTEIN 40g
VITAMIN B1 (mg. per 1000 NON-FAT CALS.)
MAR MAY JULY SEPT NOV JAN MAR MAY JULY SEPT. NOV JAN MAR MAY JULY SEPT NOV. JAN MAR. MAY JULY SEPT.
1942 1943 1944 1945

Fig. 1—Monthly incidence of beriberi compared with estimated total calories and vitamin B_1/non-fat-calorie ratio of diet.

During the last six months it fell to 2000 in the heavy-duty scale, 1700 in the light-duty scale, and 1500 in the no-duty scale. Apart from the first few months and the last six months, the calorie intake was not grossly inadequate. The same might be said of the protein content. The fat intake was low for the first few months but thereafter was usually above 50 g. per day. The calcium and phosphorus intakes reached a satisfactory level owing to the dried fish, which was mostly in the form of sprats, and the green leaf vegetables in the diet. Part of the daily ration of cooking-oil was red palm oil, and this together with the green leaf vegetables supplied a high vitamin-A intake. Green leaf vegetables and root vegetables supplied adequate quantities of vitamin C. The diet for long periods was inadequate in several components of the vitamin-B complex. It has only been possible to estimate the vitamin B_1, riboflavine, and nicotinic acid contents, and in all of these there is some deficiency. The position as assessed by estimating the food value of the diet might be summarised as follows. For three out of the three and a half years the energy intake was not grossly inadequate, but for the greater part of the time there was an imbalance in vitamin-B complex. In the last six months there was semi-starvation, with the imbalance, especially of vitamin B_1, still persisting.

In estimating the beriberi-producing potentialities of the diets as prisoners-of-war the formula suggested by Williams and Spies (1938) was used. This formula is the ratio of vitamin B_1 in the diet to the non-fat calories. The vitamin-B_1 values given by these writers have been used in the estimations. In comparison with the figures published more recently, these values are low, but, as will be seen subsequently, this method of appraising diets by relating them to the production of beriberi fitted the picture as it occurred in the camp and proved a reliable means of forecasting the incidence of beriberi. It is to be noted, however, that only when the values of Williams and Spies are used can the vitamin B_1/non-fat-calorie ratio of 0·3 be considered as the level at which clinical evidence of deficiency will appear.

The estimated levels of nicotinic acid and riboflavine are shown in table III. Since, with a variation in the calorie value of the diet from 3000 to 1400 the absolute intakes of nicotinic acid and riboflavine would be misleading, it seemed advisable to relate the intakes of these vitamins to the total energy value; they are therefore also shown in milligrammes per 1000 calories. The content of these three vitamins has been calculated from the tables compiled by Platt (1945).

BERIBERI

The number of fresh cases of beriberi admitted to hospital per 1000 population per month is shown in fig. 1, with the vitamin B_1/non-fat-calorie ratio of Williams and Spies (1938) and the estimated total calorie intake. It was clear from the beginning of the camp that beriberi must occur. The estimated daily intake of vitamin B_1 for the first two months was less than 0·4 mg. and the vitamin B_1/non-fat-calorie ratio was under 0·2 mg./1000. No allowance was made for loss of the vitamin in the preparation and cooking of food, and in the first few weeks probably 25% was lost in this way, bringing the daily intake down to 0·3 mg. Steps were then taken to check this loss of vitamin. Cases of peripheral neuritis ascribed to beriberi were admitted to hospital within a month of the start of this imbalanced diet. All the early cases were in men who had a recent history of addiction to alcohol, but the neuritis appeared in men with no such history within six weeks.

At this time, as mentioned above, a dysentery epidemic was in progress, and some of the patients severely ill with this disease developed the superior hæmorrhagic encephalopathy of Wernicke. Treatment and prophylaxis with vitamin B_1 were eminently satisfactory.

The outbreak of beriberi neuritis was ended in November, 1942, by improvement in the diet, and from then until May, 1944, there was a relative freedom from the disease. In the early part of 1944 the vitamin B_1/non-fat-calorie ratio began to drop and a further outbreak of beriberi was anticipated. In due course it appeared (fig. 1), and it persisted until the camp ended.

This outbreak may be divided into two periods: (1) from May, 1944, to March, 1945, and (2) from March, 1945, until the end. During the first period œdema was by far the most common manifestation and in a proportion of cases was not accompanied by any of the other recognised signs of beriberi. The clinician, however, was satisfied that this was beriberi, and the results of treatment with the pure vitamin supported his view (Cruickshank 1946). The dietary picture also indicates that this was the diagnosis. In fig. 1 it will be seen that at the end of the first period the calorie intake was about 2600 and the protein about 60 g. per day. Apart from the chronic dysenterics, no emaciated men were seen at this time, and a representative group of men showed an average loss of only 14 lb. on their weight before becoming prisoners. These men lost a further 15 lb. in the last six months but they still could not have been grossly emaciated at the end of the third year. Again, the man who got the "beriberi" was not the emaciated chronic dysenteric but the man employed on the heavier work who would seem relatively fit one day and be grossly œdematous the next. It can be presumed therefore that during this period the symptoms were a manifestation of vitamin-B_1 deficiency.

In the second period—March, 1945, to August, 1945—a new type of case appeared. The clinician recognised a different clinical picture, occurring in the emaciated man

and resistant to treatment with vitamin B_1. As can be seen from fig. 1 there was a considerable drop in the calorie and protein intakes. During the last six months the calorie intake remained around the 2000 level and the protein around 40 g. The vitamin B_1/non-fat-calorie ratio during this period was still at the level at which symptoms would be expected, and cases were still occurring which were probably beriberi. It seemed certain that, in the later stages of the camp, two factors were producing deficiency symptoms—an inadequate calorie and protein intake; and an imbalance in vitamin B_1—and that while some individual cases appeared to be due to one or other factor, in the majority both factors played a part in producing symptoms.

To sum up, in the first three years vitamin-B_1 deficiency manifested itself in the form of œdematous, cardiac, and neuritic beriberi and as Wernicke's encephalopathy, and in the last six months, while fresh cases of beriberi continued to occur, the picture was complicated by famine œdema.

During the last few years much experimental work on the minimal and optimal requirements of vitamin B_1 has been done and there is considerable divergence in the estimates of these requirements. During the term of imprisonment, the diet was so deficient in vitamin B_1 that symptoms appeared; it then so improved that fresh cases practically ceased to arise; and lastly it again deteriorated and fresh cases appeared. This experience might indicate which of the levels for minimal intakes found by different workers in induced deficiency are correct. But two criticisms might be levelled at this evidence. The first is that the vitamin B_1 is estimated from food tables and cannot be as accurately known as in an experimental study. This error, however, is not likely to be so great that one cannot give a sufficiently accurate figure for the intake which produced disease. The second criterion is no biochemical investigations have been possible and the more crude criterion of clinical observation has had to be used. On the other hand, the number of experimental subjects in this study has averaged 12,000 over the three and a half years, and since there is a wide individual variation in the utilisation of vitamin B_1 this large number is probably a considerable advantage in deciding the minimal intake. Although dysentery was extremely common it was usually not of a severe type, and in only 14% of cases in the first outbreak were recent attacks of this disease associated with beriberi. In the later outbreak malaria was common and possibly precipitated beriberi in some patients. Again, the emotional state of the troops at the beginning might by raising their metabolic rate have increased their need for vitamin B_1. All these factors may have affected the findings, but it nevertheless seems profitable to draw conclusions as to the level of vitamin-B_1 intake at which symptoms appear.

The vitamin B_1 content of the diet has been estimated from two food-value tables—those of Williams and Spies (1938) and of Platt (1945). The values given by Platt for the different foodstuffs in question are on the whole somewhat higher than those suggested by Williams and Spies. In their figures Williams and Spies allowed for loss in preparation and cooking, but after the first few weeks the loss in the camp, if judged by present-day views on the destructibility of vitamin B_1, must have been negligible, so estimations based on these data probably give a low assessment of the vitamin B_1 in the diet. Table II shows the vitamin-B_1 intake as estimated from both tables.*

If the incidence of beriberi is related to the vitamin-B_1 intake as estimated from the higher value tables, it will be seen that the disease appeared in about six weeks

* In table II it will be seen that the total vitamin-B intake reached 1·6 and 1·3 mg. in October and November, 1944. This high level was due to soya bean in the diet. Soya beans, unless processed, are singularly indigestible, and in a prisoner-of-war camp where boiling was the only method of preparation they apparently passed through the bowel unaltered. It seems reasonable to assume that little of the vitamin B_1 was absorbed and that these figures for the B_1 intake for two months were too high. Again, in the last seven months the vitamin B_1/non-fat-calorie ratio estimated by the higher values will be seen to be relatively high. This is due to the high levels attributed to green leaf vegetables, and clinical experience leads one to believe that these figures were again too high.

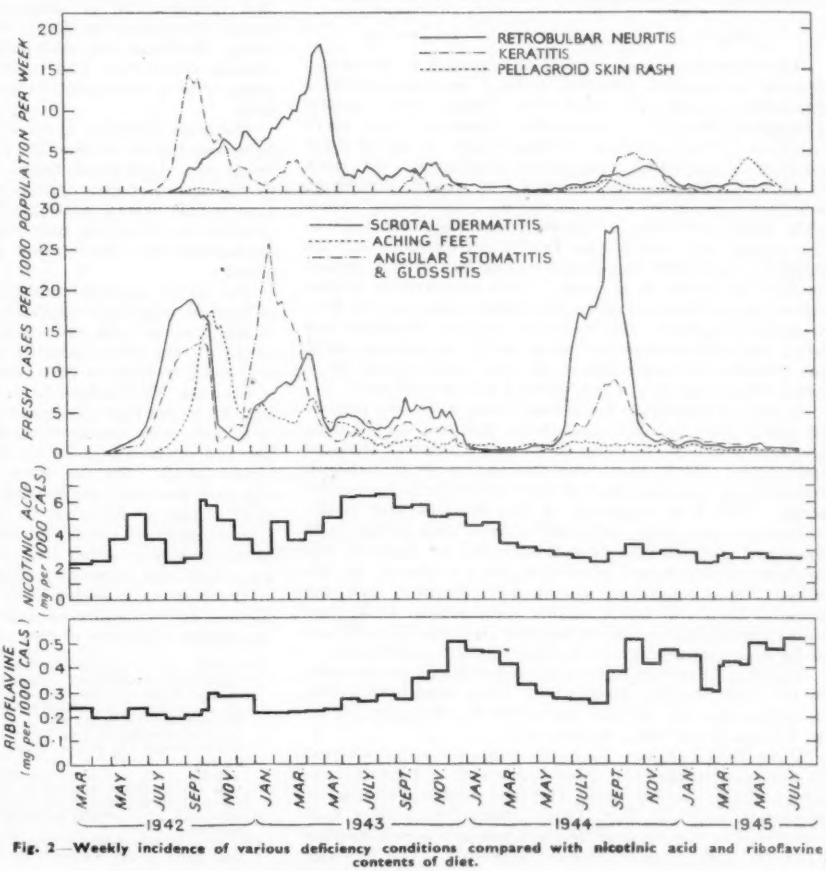
RETROBULBAR NEURITIS
KERATITIS
PELLAGROID SKIN RASH
SCROTAL DERMATITIS
ACHING FEET
ANGULAR STOMATITIS & GLOSSITIS
FRESH CASES PER 1000 POPULATION PER WEEK
NICOTINIC ACID (mg per 1000 CALS)
RIBOFLAVINE (mg per 1000 CALS)
MAR MAY JULY SEPT NOV JAN MAR MAY JULY SEPT NOV JAN MAR MAY JULY SEPT NOV JAN MAR MAY JULY
1942 1943 1944 1945

Fig. 2—Weekly incidence of various deficiency conditions compared with nicotinic acid and riboflavine contents of diet.

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on a daily intake of 0·2 mg. per 1000 non-fat calories (N.F.C.) or a total intake of 0·39 mg., and that fresh cases ceased to occur when the daily intake rose to 0·5 mg. per 1000 N.F.C. or a total of 1·2 mg.; a further outbreak started when the daily intake fell to 0·36 mg. per 1000 N.F.C. or a total of 0·9 mg. If the levels are estimated from the lower figures, the disease appeared in six weeks on a daily intake of 0·18 mg. per 1000 N.F.C.; fresh cases ceased to arise when the intake reached 0·47 mg. per 1000 N.F.C.; a further outbreak occurred when the intake dropped to 0·26 mg.; and fresh cases kept appearing as long as the intake was below 0·3 mg. and even when it reached the higher level of 0·33 mg. per 1000 N.F.C.

In deciding whether a diet is beriberi-producing, a vitamin-B_1 intake of 0·3 mg. per 1000 N.F.C. should be regarded as an absolute minimum and if the higher values of the more recent food tables are used 0·4 mg. is probably the minimum. This experience suggests that the 0·37 mg. per 1000 N.F.C. found to be adequate for normal carbohydrate metabolism in experimental conditions by Keys and colleagues (1943) is inadequate to prevent cases of disease appearing in a large group. There was a great individual variation in susceptibility to beriberi which might be accounted for by variations in the requirement of vitamin B_1 for carbohydrate metabolism or possibly by varying degrees of biosynthesis (Najjar and Holt 1943). Whatever the reason, this experience supports the views of Williams and colleagues (1943a), who, on the evidence of induced deficiency, concluded that the much more liberal allowance of 0·66 mg. per 1000 N.F.C. is a minimum intake to maintain normal carbohydrate metabolism.

DISEASE DUE TO DEFICIENCY OF VITAMIN B_2

The following disease conditions appeared in the camp: angular stomatitis, glossitis, palatal erythema, scrotal dermatitis, pellagroid skin rash, aching feet, spastic paraplegia, keratitis, retrobulbar neuritis, and nerve deafness. The incidence of fresh cases of six of these conditions per 1000 susceptible population per week is shown in fig. 2. The incidence of spastic paraplegia and nerve deafness is not shown in graph form. Since only about 40 cases of spastic paraplegia occurred in the camp, all within the first eighteen months, the incidence per 1000 population was so low that it cannot readily be shown in a graph. They occurred at a time when the incidence of other conditions, such as sore feet, was as its highest. The incidence of nerve deafness was high, but it was often not noticed by the sufferer until his friends drew attention to it, so a record of the fresh cases would not give a true picture of the outbreak.

It can be seen from fig. 2 that there were two periods of fairly high incidence of these diseases, and during the remainder of the time there was a relative freedom from them. There were also two outbreaks of beriberi, but the first was small and of short duration and occurred early. The first outbreak of the diseases now under discussion was large, extended over a long period, and appeared later. The second outbreak of beriberi was protracted and larger, while the later outbreak of the other disease conditions was of short duration and—for some of them—of much smaller dimensions. It is clear that there is little similarity between the trend of incidence of beriberi and any of these other disease conditions.

The clinical picture of the commoner conditions answers in the main to the descriptions given elsewhere. The keratitis was the disease described by Métivier (1941) as "corneal epithelial dystrophy."

Time Distribution.—There are some points of interest in the relative times of appearance and of highest incidence of these conditions. The first evidence of disease appeared early in May, 1942—about two and a half months after the capitulation and one and a half months after the first cases of beriberi appeared. The glossitis and angular stomatitis and scrotal dermatitis were the first to appear; next came aching feet at the end of July, 1942, nearly three months later—i.e., five and a half months after the capitulation. Keratitis and retrobulbar neuritis appeared at the middle and end of August respectively. It will be seen that there is a tendency to follow this trend throughout. In October and November, 1942, the incidence of mouth conditions and scrotal dermatitis showed a sharp decline; the decline of aching feet was slower and less definite, and there was little evidence of any change in the slowly rising incidence of retrobulbar neuritis. In the subsequent increase in January and February, 1943, this order was again followed, though not so definitely. At this time there was a rapid increase in mouth conditions and a less rapid increase in scrotal dermatitis. Aching feet and keratitis showed a slowly increasing incidence but it did not reach any height. In 1944 scrotal dermatitis and mouth conditions again showed a rapidly rising incidence, starting at the end of May and beginning of June, while keratitis began to increase in August. Aching feet were not much in evidence at this time, and, though there was a rise in the incidence of retrobulbar neuritis, it began earlier and did not reach a high level.

There is then some evidence of a relationship between all these conditions as regards the beginning and end of outbreaks and they appear to fall into three groups †:

1. Mouth condition and scrotal dermatitis.
2. Keratitis and aching feet.
3. Retrobulbar neuritis.

There are, however, some features which do not fit into this picture—the persistence of a high incidence of scrotal dermatitis in March and April, 1943; the slowly rising incidence of retrobulbar neuritis before other disease conditions had appeared in 1944; and the absence of a clear-cut outbreak of aching feet at that time.

The high incidence of scrotal dermatitis might perhaps be accounted for by the fact that when a deficiency state exists the devitalised tissue is particularly susceptible to the action of any irritant or to invasion by bacteria, and in this case a particularly irritant soap or lack of facilities for washing may have been responsible. No explanation for these other phenomena springs to the mind.

The other disease condition shown on the chart—pellagroid skin rash—appeared twice during outbreaks of the diseases just discussed, but the largest outbreak began in the early months of 1945 when these other deficiency conditions were almost absent.

Relation to Nicotinic-acid and Riboflavine Intake.—Fig. 2 ‡ shows that all these conditions, except pellagroid skin rash, were common when the riboflavine level was low and outbreaks came to an end when it reached the higher levels. On the other hand, only the pellagroid skin rash bore any relationship to the estimated nicotinic-acid content of the diet, its appearance coinciding with a low intake of nicotinic acid, though it did not consistently appear when the intake was low. This rash was a mild one, appearing almost entirely in men working in the sun, so it seems that frank clinical evidence of disease only manifested itself under certain climatic conditions with this degree of nicotinic-acid deficiency.

† Woodruff, M. (unpublished data), after correlating information concerning associated conditions, concluded that deficiency disease in the Changi Camp could be divided into two groups: (1) a beriberi (B_1-deficiency) group, and (2) the remainder, the B_2-complex-deficiency group. He pointed out that 49 % of the cases of peripheral neuritis showed other evidence of beriberi, while in only 5 % of the disease conditions in group 2 was there an association with beriberi. Of over 1000 cases of retrobulbar neuritis, 35 % had keratitis, 20 % aching feet, and 28 % stomatitis and glossitis, while only 1 % had beriberi. Of nearly 700 cases of aching feet, 31 % had retrobulbar neuritis, 29 % keratitis, and 24 % scrotal dermatitis, while 7 % had an associated beriberi.

‡ The scale in this figure is based on the relative requirements as laid down by the National Research Council of America, 1942

TABLE I—DAILY ISSUE OF FOODSTUFFS

Foodstuff	1942										1943	
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Rice (highly milled)	427	435	469	460	503	506	487	474	483	483	508	500
Flour (white)	54	63	48	48	51	45	46	..	..	..	..	..
Sugar (white)	17	20	20	17	24	26	26	19	20	20	20	20
Biscuits (wholemeal)	9	..	..	..	..	..	..	..	..	..	..	..
Wheat (whole grains)	..	6	26	6	..	..	..	..	..	..	..	..
Ground-nut meal	..	2	8	26	12	..	..	..	..	..	..	..
Ground-nut	..	..	5	4	..	..	..	..	..	5	3	2
Beans (canned)	14	6	6	1	..	..	..	..	..	..	..	..
Maizemeal	..	..	..	..	..	28	19	..	..	..	..	..
Potatoes (canned)	3	..	..	..	..	..	..	..	..	..	..	..
Pumpkin and cucumber	..	..	23	20	20	20	43	44	79	94	104	95
Sweet potatoes	..	..	..	20	20	20	68	109	61	124	160	161
Green leaf	2	..	..	15	15	15	25	11	4	4	28	18
Egg plant	..	..	..	..	..	..	18	..	18	..	..	..
Turnip and radish	..	..	..	..	..	..	..	..	15	9	..	..
Jam and fruit (canned)	7	4	3	11	..	23	..	..	..	..	..	..
Meat and veg. and Irish stew	26	17	1	..	..	..	..	4	..	..	..	..
Meat	26	23	39	52	53	43	45	37	35	26	..	..
Fish	10	..	..	..	..	..	..	..	7	17	44	41
Cheese, butter and margarine (canned)	9	..	..	..	..	..	..	..	..	17	..	..
Ghi	3	6	8	5	7	10	9	6	10	..	7	8
Evaporated milk	26	26	4	..	..	..	..	..	..	..	..	..
Rice polishings	..	..	..	..	..	..	6	22	28	23	..	14
Whitebait	..	..	..	..	..	..	4	12	13	12	..	3
Red palm oil	..	..	..	..	..	..	..	11	10	7	15	11
Coconut oil	..	..	..	..	..	..	..	..	..	4	10	13
Atta flour	..	..	..	..	..	..	..	11	..	..	..	..
Kaffir corn meal (sorghum)	..	..	..	..	..	..	11	..	..	..	..	..
Dried soup powder	..	..	..	..	..	11	..	..	..	..	..	..
Vitaminised caramel	..	..	..	..	..	4	..	..	..	..	..	..
Soya bean	..	..	..	..	..	..	..	..	..	1	14	12

Foodstuff	1943										1944								
	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
Rice	440	440	440	440	440	440	444	440	487	350	330	310	316	270	415	500	500	495	460
Soya beans	..	..	..	..	..	..	..	..	..	170	150	129	96	..	..	..	..	..	..
Maize	..	..	..	..	..	..	..	..	..	..	..	..	62	131	45	..	..	..	..
Sugar	20	17	20	19	19	22	20	20	20	20	20	23	18	18	20	18	17	20	20
Coconut oil	17	16	21	18	20	30	25	25	25	25	23	21	25	25	25	25	25	25	25
Fresh fish	30	43	62	47	53	84	73	30	56	77	57	..	..	..	18	9	10	..	11
Dried fish	..	..	..	..	..	..	..	22	..	..	..	19	17	..	..	44	45	39	32
Fresh meat	..	..	..	..	..	..	..	..	..	..	9	44	53	71	56	13	..	..	..
Pork	..	..	..	..	..	..	..	..	..	4	4	4	4	..	..	..	..	..	..
Green leaf vegetable	6	5	6	..	..	..	90	90	89	70	42	36	64	50	55	60	72	180	..
Musk melons, pumpkins, &c.	38	4	80	95	44	128	143	170	100	226	100	186	40	..	..	..	..	..	..
Sweet potatoes, cassava, &c.	198	199	70	114	85	200	200	170	200	200	200	200	120	150	125	325	320	260	165
Bananas	..	..	..	..	..	..	..	..	..	..	..	..	93	10	95	90	70	32	21
Coconut	..	..	..	..	..	..	..	..	..	..	..	..	3	20	7	5	..	16	..
Green gram	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
Pineapple	..	..	..	..	..	..	..	..	..	..	..	..	..	..	67	5	..	..	..
Camp Messing Fund																			
Rice polishings	23	28	28	28	28	16	16	8	8	..	..	..	..	..	..	..	..	..	..
Ground-nuts	12	13	28	28	..	18	28	14	..	2	30	14	5	..	..	..	..	..	..
Green gram	13	40	45	57	90	85	85	85	85	85	25	85	76	15	31	4	7	11	12
Soya bean	..	4	11	6	..	..	..	..	..	..	..	..	..	..	..	8	7	4	..
Dried horse mackerel	18	17	14	..	..	..	3	9	2	..	..	..	..	..	..	..	..	..	..
Whitebait	..	..	28	57	47	28	14	18	23	1	2	..	..	..	..	..	..	..	..
Red palm oil	..	..	14	3	..	..	..	..	3	17	9	3	8	14	13	16	20	22	10
Sweet potatoes	..	..	78	165	145	114	85	..	..	..	..	..	..	..	..	..	..	..	..

Foodstuff	1944			1945					Foodstuff	1945				Foodstuff	1945
	Oct.	Nov.	Dec.	Jan.	Feb.		March			April		May	June	July		Aug.
					1–9	10–28	1–9	10–21	21–31		1–22	23–30				1–15
Maize	..	..	..	..	..	..	..	..	50	Rice	220	250	300	277	277	Rice	270
Rice	460	460	464	460	459	495	450	270	220	Maize	50	50	..	23	23	Maize	43
Sugar	20	19	20	20	18	18	18	18	18	Sugar	18	18	18	20	20	Sugar	20
Oil	25	25	25	25	25	20	20	20	20	Oil	20	20	20	20	20	Oil	22
Soya bean	59	48	..	..	..	..	..	..	..	Fresh fish	10	10	7	6	..	Fresh fish	5
Fresh fish	9	..	..	10	..	13	6	6	6	Dried fish	24	24	35	26	13	Dried fish	29
Dried fish	38	34	29	25	34	15	22	22	22	Vegetable (root)	172	172	183	66	122	Meat	4
Vegetable (root)	136	112	163	195	208	60	24	178	178	Greens	187	187	297	256	298	Vegetable (root)	82
Greens	283	212	300	284	297	150	140	164	164	Fruit	..	..	22	7	..	Greens	312
Fruit	44	14	26	23	26	13	..	..	..	*C.M. Fund*						*C.M. Fund*	
C.M. Fund										Oil	33	33	33	33	33	Oil	33
Green gram	10	1	15	15	15	13	12	12	12	Millet	12	..	..	..	..	Tap chips	10
Palm oil	5	10	13	18	18	18	18	18	33	Tap chips	..	12	12	12	10		

Diets in April, May, and June, 1945, were supplemented with food from Red Cross parcels. The amounts were very small—about 40 g. per man per day of chocolate, jam, bully beef, &c.

Details of the light-duty and no-duty scales introduced in February and April, 1945, respectively, have been omitted owing to lack of space.

C.M. Fund = Camp Messing Fund

Since some of these conditions are probably manifestations of riboflavine deficiency the estimated levels of intake at which symptoms appeared are worthy of note. On an estimated level of 0·21–0·25 mg. per 1000 calories, symptoms appeared in two and a half months in 1942; in 1944, on an intake of 0·33–0·28 mg. per 1000 total calories, this appeared in about the same time. It is not clear, on the basis of our estimated levels, why the number of cases should have fallen in October, November, and December, 1942. The improvement was due to Red Cross supplies coming into camp.* For purposes of estimation, the diet during the period under discussion was assumed to be in accordance with the advice given on how the extra food should be consumed; but, since it was distributed to units and in some cases to individuals, the extra food may in fact have been consumed more rapidly with a resultant higher intake over a shorter period.

TABLE II—RED CROSS SUPPLEMENTS OCT. 9 TO NOV. 30, AND DEC. 1 TO 27, 1942

Foodstuff	Average daily diet (g.)		Foodstuff	Average daily diet (g.)	
	Oct. 9–Nov. 30	Dec. 1–27		Oct. 9–Nov. 30	Dec. 1–27
Atta flour ..	17	..	Dried fruit ..	2	..
Dhall	8	8	Cocoa ..	8	8
Milk (canned) ..	21	9	Barley ..	1	..
M. & V.	39	39	Cornflour ..	2	..
Corned beef ..	71	32	Biscuits ..	9	..
Ghee	8	..	Vitaminised caramels ..	1	..
Soupmix	3	3	Jam	2	..
Mabela	10	10	Sugar (white) ..	17	..
Vegetables and tomatoes (canned)	23	23	Lime juice ..	2	..
Guava (canned) ..	9	9			

In fig. 2 it will be seen that a fresh outbreak of keratitis occurred in October, November, and December, 1943, at a time when the riboflavine values of the diet were higher than they had been, and there is evidence of a similar rise in the other conditions. In August the Japanese began making a big aerodrome near the camp and labour was drawn from the camp. Labouring in the heat of the day and in the full glare of the sun may have played some part in producing this increase.

In general the estimated intake of riboflavine corresponds fairly closely with the incidence of disease, so it seems worth while to compare the level at which disease occurred with similar levels found by workers in induced deficiency. Sebrell and colleagues (1941) produced deficiency disease which appeared between the 89th and 232nd days on a riboflavine intake of 0·21 mg. per 1000 total calories. This is in line with experience in the camp where disease developed in 80 days on an intake of 0·21–0·25 mg. per 1000 calories. Williams and colleagues (1943b) found no deficiency disease on an intake of 0·35 mg. per 1000 calories. In the camp disease persisted on this level although it had begun on a lower intake and on two occasions the outbreak of disease did not end until the level reached 0·5 mg. per 1000 calories. This would support the suggestion of Williams and colleagues that 0·5 mg. per 1000 calories is an adequate intake.

There were further experiences which have some bearing on this point. In 1943 a party of 7000 men went up country and 25% of them had vitamin-B_2 deficiency in one or more of the forms which have just been discussed. They went up to conditions of starvation, disease, and appalling hardship, and at the end of nine months when 44% had already died they were returned to the Singapore camp. Within a week or two of leaving the relative comfort of the camp the minor manifestations of vitamin-B_2-deficiency disease disappeared and did not recur as long as the conditions of hardship lasted. Little or no retrogression in cases of retrobulbar neuritis could be found on their return. The calorie intake during this expedition was at times as low as 1200 per day and although it was at other times above the 2000 level rapid loss of weight occurred. The Japanese were merciless in their demands for output of work, and this itself was the direct cause of a number of deaths. The diets consisted of rice and very little else, and the riboflavine intake for long periods was about 0·2 mg. per 1000 calories; for about a month in one camp it was as low as 0·15 mg. per 1000 calories.

When a man is consuming his own tissues his needs for riboflavine may be less, and this idea led me to investigate the relative incidence in different groups of men in Changi Camp. In the kitchens and food stores the men were better fed; hungry men cannot be expected to handle food all day without taking a certain amount of it. On the other hand the men working on the Japanese aerodrome got only their bare rations and were called on for a greater energy output. In the better fed group the incidence of scrotal dermatitis during an outbreak was 34% and in the worse fed group it was only 18%. There were several hundred men in each sample and unfortunately weights were not taken, but had they been there is little doubt that there would have been a clear-cut difference. The impression gained was that riboflavine deficiency was essentially the disease of the man who was maintaining or gaining weight. The pellagroid skin rash on the other hand occurred essentially in emaciated men. In some 60 men treated for skin rash in hospital the average weight was 102 lb., while a group of fit men at the same period had an average weight of 125 lb.

PREVENTION OF DEFICIENCY DISEASE

In the prevention of deficiency disease beriberi was always regarded as being of primary importance, for it is a killing disease. The vitamin-B_2-deficiency diseases, though they seemed likely to be responsible for a considerable amount of permanent incapacity, were unimportant as a cause of death. Steps taken to prevent beriberi built up the diet to a greater or less extent in components of the vitamin-B_2 complex and some measures taken had both purposes in mind. It seems advisable, however, to deal with each separately.

Beriberi.—The occurrence of beriberi was foreseen some time before it actually appeared, and attempts were made immediately to minimise the danger. The best means of doing this was of course to enrich the diet, and in March, 1942, the G.O.C. Prisoner-of-war Camp, Changi, wrote to the H.Q. Imperial Japanese Army pointing out that the diet was grossly deficient in certain vitamins and asking for additional foodstuffs which were known to be in Singapore in considerable quantity. The Japanese did nothing, although the case was presented again and again in the early months.

A measure which was adopted early and to which considerable attention has been paid throughout was the preparation and cooking of food so that none of its vitamin content was lost. This is particularly important in the case of the rice. The ordinary highly milled rice has about 0·5 μg. vitamin B_1 per g. in the pericarp dust and fine layers of pericarp that may remain after milling. It is however readily soluble in water, and if it is washed and the water discarded about half of it is lost, while if it is boiled in excess of water which is afterwards discarded there is a further loss. Seeing that at times the total daily intake of vitamin B_1 was not more than 0·4 mg., and that 0·2 mg. came from rice, the importance of this measure can be appreciated.

A measure which is widely advocated for preventing beriberi is the growing of yeast, but unfortunately unless yeast is grown on a medium rich in the vitamin-B complex it has little capacity to synthesise this vitamin. In fact recent work (Malm 1945) suggests that it does not synthesise it at all but simply captures it from the medium in which it is grown. Yeast was grown in the

early days of the camp but it proved of little value in clinical use and was abandoned as a means of prophylaxis.

For about eighteen months in the existence of the camp—i.e., from November, 1942, until May, 1944—by pooling money coming into the camp and by purchasing and issuing foodstuffs rich in vitamin B_1 on a fixed scale the diet was maintained above the beriberi level. In table I under the heading "camp" the details of food purchased can be seen. In the last year the money for purchasing foodstuffs was less and the prices were fantastically high, so little could be done to supplement the imbalanced and latterly inadequate diet. When the Japanese learnt of their country's capitulation they offered as much rice as was wanted. The consumption of large quantities of rice at this time would have led to very grave imbalance, resulting in severe beriberi. A strong stand was taken in this matter, and after some protest it was agreed to restrict the daily issues of rice to a level which would not cause a serious imbalance. Fortunately this period was short, and with the arrival of relieving troops the prisoners-of-war went back to a European diet.

Vitamin-B_2-deficiency Disease.—The minor manifestations in the syndrome referred to as vitamin-B_2-deficiency disease in this paper were believed to be due to a riboflavine deficiency. There was a significant association between disease conditions in this group, and no such association could be found between them and beriberi. In addition, the commencement, course, and cessation of outbreaks led us to think that, excepting pellagroid skin disease, they probably had a common ætiological factor.

The policy in prevention was based on raising the riboflavine value to the highest possible level. Some tables of riboflavine values were available in the camp, but they were old and judged by the more recent tables highly inaccurate. They did indicate however that, of the limited foods available, fresh green leaves and légumes were the only ones which could be obtained in sufficient quantity to be of value. This was the reason for the main items in the supplementary foodstuffs purchased.§

§ The other foodstuffs were introduced for the following purposes: (*a*) The rice polishings were to ensure the absence of beriberi and also to raise the nicotinic-acid level. (*b*) The palm oil was to increase the calorie intake and make the food more palatable. (*c*) The dried fish, preferably sprats, was to maintain at a reasonable height the calcium and protein intake.

TABLE III—ESTIMATED FOOD VALUE OF FOODSTUFFS

—	1942											1943			
	March	April	May	June	July	Aug.	Sept.	Oct. 1–9	Oct. 9–31	Nov.	Dec.	Jan.	Feb.	March	April
Protein, g.	41	40	45	50	47	43	48	50	83	85	67	41	43	48	59
Non-fat cals.	1874	1911	2058	2017	2120	2271	2251	2075	2480	2452	2259	2173	2181	2062	2243
Total cals.	2060	2060	2263	2222	2315	2466	2548	2260	2899	2973	2659	2340	2330	2313	2568
Vitamin B_1, µg.	390	405	593	732	551	488	678	953	1191	1246	1159	715	923	1140	1410
Riboflavine, µg.	498	434	470	566	517	484	555	559	905	890	824	557	570	586	699
Nicotinic acid, µg.	6809	7001	11,097	14,299	10,997	8489	11,194	15,366	19,180	20,782	18,588	11,142	13,892	17,118	19,601
B_1 (mg.) per 1000 non-fat cals.	0·21	0·21	0·29	0·33	0·26	0·21	0·30	0·46	0·48	0·51	0·51	0·33	0·42	0·55	0·63
Riboflavine (mg.) per 1000 total cals.	0·24	0·21	0·21	0·25	0·22	0·20	0·22	0·25	0·31	0·30	0·31	0·24	0·24	0·25	0·27
Nicotinic acid (mg.) per 1000 total cals.	3·31	3·40	4·90	6·44	4·75	3·44	4·39	6·80	6·62	6·99	6·99	4·76	5·96	7·40	7·63
Williams and Spies: Vitamin B_1	316	341	526	587	424	393	559	842	1075	1161	1053	474	766	1019	1234
B_1 : non-fat cals.	0·17	0·18	0·26	0·29	0·20	0·17	0·25	0·40	0·43	0·47	0·47	0·22	0·35	0·49	0·55

—	1943								1944							
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.
Protein, g.	87	106	98	86	88	85	84	137	95	109	96	47	49	65	63	56
Non-fat cals.	2300	2612	2632	2583	2472	2419	2579	2542	2099	2239	2259	1788	2161	2546	2485	2366
Total cals.	2867	3049	2911	3057	2854	2800	2942	3295	2834	2862	2891	2411	2691	3039	2928	2943
Vitamin B_1, µg.	1651	1812	1701	1561	1784	1352	1262	3039	2685	2577	2201	1000	924	919	887	818
Riboflavine, µg.	872	1014	1026	1022	1034	1111	1104	1653	1226	1380	1243	789	809	862	832	773
Nicotinic acid, µg.	24,377	25,990	21,177	21,189	24,941	16,892	15,012	16,771	17,346	16,625	14,259	10,284	10,818	11,477	10,778	9737
B_1 (mg.) per 1000 non-fat cals.	0·72	0·69	0·65	0·60	0·72	0·56	0·49	1·20	1·28	1·15	0·97	0·56	0·43	0·36	0·36	0·35
Riboflavine (mg.) per 1000 total cals.	0·30	0·33	0·35	0·33	0·36	0·40	0·38	0·50	0·43	0·48	0·43	0·33	0·30	0·28	0·28	0·26
Nicotinic acid (mg.) per 1000 total cals.	8·50	8·52	7·27	6·93	8·74	6·03	5·10	5·09	6·12	5·81	4·93	4·27	4·02	3·78	3·68	3·31
Williams and Spies: Vitamin B_1	1441	1568	1390	1610	1433	1529	1418	1724	1220	1289	1155	715	704	650	630	662
B_1 : non-fat cals.	0·63	0·60	0·53	0·62	0·58	0·63	0·55	0·68	0·58	0·58	0·51	0·40	0·33	0·26	0·25	0·28

—	1944				1945											
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.		March			April		May	June	July	Aug.
						1–9	10–28	1–9	10–21	22–31	1–22	23–30				1–15
Protein, g.	54	80	79	62	62	69	49	48	42	43	50	51	63	50	40	55
Non-fat cals.	2112	2259	2144	2161	2181	2222	2046	1824	1406	1390	1476	1587	1706	1456	1435	1480
Total cals.	2493	2696	2600	2579	2637	2696	2436	2205	1797	1799	2108	2219	2320	2051	1984	2057
Vitamin B_1, µg.	823	1592	1273	990	997	1015	645	554	636	771	818	802	861	728	619	877
Riboflavine, µg.	963	1398	1092	1237	1212	1245	744	671	734	774	878	887	1172	968	1026	1126
Nicotinic acid, µg.	9583	11,664	9834	10,140	10,289	10,537	7999	7218	6700	6950	7704	7980	9266	7466	7220	8375
B_1 (mg.) per 1000 non-fat cals.	0·39	0·70	0·59	0·46	0·46	0·46	0·32	0·30	0·45	0·55	0·55	0·51	0·50	0·50	0·43	0·59
Riboflavine (mg.) per 1000 total cals.	0·39	0·52	0·42	0·48	0·46	0·46	0·31	0·30	0·41	0·43	0·42	0·40	0·51	0·47	0·52	0·55
Nicotinic acid (mg.) per 1000 total cals.	3·84	4·33	3·78	3·93	3·90	3·91	3·28	3·27	3·73	3·86	3·65	3·60	3·99	3·64	3·64	4·07
Williams and Spies: Vitamin B_1	547	743	602	595	590	607	421	360	490	490	523	514	494	412	442	486
B_1 : non-fat cals.	0·26	0·33	0·28	0·28	0·27	0·27	0·21	0·20	0·35	0·35	0·35	0·32	0·29	0·28	0·31	0·33

The amounts arrived at were as follows:

Rice polishings	30 g.
Palm oil	30 c.cm.
Green gram (*Phaseolus radiatus*) ..	100 g. in all
Ground-nut	
Soya bean	
Sprats or dried fish	50 g.

The camp food tables indicated that the green gram, *Phaseolus radiatus*, had an unusually high riboflavine content while that of soya bean was low. The more recent tables show the reverse, but in view of our information the green gram was always purchased in preference to the other légumes. It will be seen from fig. 2 that the riboflavine level of the diet did not reach any great height until December, 1943, and from table I it will be clear that the cessation of the outbreak of vitamin-B_2-deficiency disease was probably due to the introduction by the Japanese of 170 g. of soya bean in place of an equal amount of rice.

The importance of green leaf vegetables in the diet was appreciated by the British administration in the camp, but, for the first two years, the Japanese were either indifferent or could not be made to understand that much sickness could be avoided if they would allow the proper cultivation of vegetable gardens. At the end of the second year a new Japanese commandant was more intelligent about the matter and good vegetable gardens were made. From September, 1944, until the end of the camp these gardens were probably responsible for our freedom from these diseases. In fig. 2 it will be seen that the riboflavine content was higher in that period.

Since no green leaf vegetables were available at the time of our greatest need and légumes were not obtainable in the required quantities, at the beginning of 1943 it seemed worth while to try to extract the vitamins from some of the non-edible plants and grasses growing round the camp. Fortunately power was available and the engineers built various ingenious devices for crushing leaves so that their cellular structure was broken down. They were then macerated with water and the extract was drunk. As long as fresh rapidly growing structures were available the results obtained from this extract were excellent, but soon the area to which the prisoners-of-war had access was cleared of all such plants. Coarse tropical grasses were then used and little benefit appeared to be derived from the extract.

SUMMARY

An outline is given of the general living conditions in the prisoner-of-war camp on Singapore Island. The Japanese ration scale and the supplements that could be procured are described.

Estimation, week by week, of the composition of the diet showed that the energy and protein intakes were not grossly inadequate except in the last six months, but there was throughout a deficiency of one or more of the B vitamins.

There were two outbreaks of beriberi. The first, which occurred early, was uncomplicated but in the second the picture was confused by famine œdema.

Comparison is made between the minimal levels of intake of vitamin B_1 to prevent disturbance of metabolism, as defined by workers on induced deficiency, and the estimated levels at which beriberi appeared or disappeared in the camp. It is concluded that the higher limits proposed on the basis of experimentally produced deficiency (0·66 mg. per 1000 non-fat calories daily) are in best agreement with experience in the camp.

The order and times of appearance of disease conditions attributed to deficiency of one or more components of the vitamin-B_2 complex are compared with those of beriberi and with the estimated riboflavine and nicotinic-acid contents of the diet. They appeared and disappeared in a definite sequence, independent of beriberi and with an inverse correlation with the riboflavine intake, except pellagroid skin rash which showed some relationship to the intake of nicotinic acid.

The requirements of riboflavine as defined by workers in induced deficiency are compared with the estimated levels in the camp diet. The level required to prevent deficiency as suggested by the camp diet is similar to the findings of some experimental workers, and camp experience again supports the higher suggested minimum levels (0·5 mg. per 1000 total calories daily).

Of 7000 men who left the camp to work up country, more than a third had signs of vitamin-B_2 deficiency in camp, and they subsequently suffered so severely from starvation and disease that 44% died within nine months; yet under these conditions the signs of vitamin-B_2 deficiency, except retrobulbar neuritis, disappeared. Further, vitamin-B_2-deficiency disease in camp was commoner in the relatively well-fed men. Pellagroid skin rash, on the other hand, was more often found in the emaciated.

The means used in attempting to combat deficiency diseases in the camp are briefly described.

I wish to thank Lieut.-Colonel Kenneth Alford, I.M.S., and Major R. Orr, A.A.M.C., for their coöperation in the prisoner-of-war camp, and Dr. Isabel Leitch, Rowett Research Institute, for her help and criticism in the preparation of this paper.

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BLOOD-GROUPS IN BONE-MARROW

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"THE fact of belonging to a definite blood-group is a fixed character of every human being and can be altered neither by the lapse of time nor by intercurrent disease" (Lattes 1932). This statement on the fixity of blood-groups may be said to represent the present consensus of opinion.

With the modern tendency to give repeated blood-transfusions in various conditions, however, replacement of the patient's red cells with donor's cells means that part of the patient's peripheral blood will evince the characters of the donor's cells. Should the donor's cells carry different hæmagglutinogens from those of the recipient, anomalous results will be obtained when attempting to establish the patient's own group, and cases are on record where all the patient's cells had been replaced and only the group of the donor could be ascertained from the patient's blood. In such a way an apparent, though not real, change of blood-group may be found. For example, the blood of case 11 of Coombs et al. (1946) appears to have been entirely replaced; and case 4 of Wiener and Sonn (1946) was an erythroblastotic infant whose Rh-positive cells were entirely replaced by Rh-negative donor cells within two days.

Hitherto, in establishing the true group of such cases, there has been little option but to wait until the donor cells have disappeared; though, as the patient's cells start to reappear, the differential agglutination method

of Dacie and Mollison (1943) may reveal the group while donor cells are still present. There are times when it is important to know the nature of a patient's cells, when complete typing has not been carried out before the institution of a line of treatment which has falsified the true picture. Such a case was seen recently at this hospital, and it was considered that investigation of the bone-marrow red cells, which are not subject to the same replacement by donor cells as are those of the peripheral blood, might establish the true blood-group. As no reference to the reliability of bone-marrow grouping could be found in the available literature, normal children were used as controls at the same time.

INVESTIGATION

Marrow was obtained from twelve children who had had no transfusions and in whom marrow puncture was being undertaken for diagnostic purposes.

The first two marrow samples were taken from the sternum with an ordinary Salah needle. As, however, the yield of sternal marrow was rather too small for the purpose, particularly in small infants, and rendered proper oxalating of the sample difficult, the later punctures were made through the flat area of bone internal and distal to the tibial tuberosity. Needles, used according to the size of the patient, were those designed by Gimson (1944) for marrow infusions.

Marrow was aspirated into a syringe, from which it was immediately expelled into a small test-tube containing double oxalate mixture (3 parts of ammonium to 2 parts of potassium oxalate) which had been allowed to dry and then moistened with a drop of normal saline just before use. If the oxalate was used dry, various degrees of agglutination jeopardised the chances of satisfactory grouping. Only marrow discharged direct into the oxalate was used, any adhering to the side of the tube being carefully avoided.

Marrow suspensions so obtained were ABO- and Rh-typed in small tubes in the ordinary way.

RESULTS

All twelve marrows showed the same ABO agglutinogens and agglutinins as those found in their corresponding specimens of blood. Similarly, no difference was found in the Rh genotypes of marrow and peripheral blood from the same patient. The presence of nucleated red cells and the myeloid series did not interfere with reading the test.

From these results it appeared that the true blood-group and Rh genotype could be ascertained from the marrow cells. Therefore marrow grouping was undertaken at intervals on the patient whose peripheral blood could not be grouped owing to repeated blood-transfusions. The following hæmatological findings are given in detail to illustrate how the divergent blood and marrow pictures came into line again as the donor cells were eliminated.

Baby X, with erythroblastosis fœtalis, was the second child of healthy parents, whose first child was normal. Baby X was born on Feb. 20, 1946, and became jaundiced on the 23rd. Blood-group A, β in the serum, Rh-positive.

The mother, blood-group A, Rh-negative, had a low Rh antibody titre at birth of the baby, and a titre of 1/64 on March 2, 1946, and 1/256 on March 5, when some blood was taken from her for preparing anti-Rh serum.

Between Feb. 24 and April 5 the baby received eight transfusions of whole blood with group-O Rh-negative blood, the rise in red-cell count after each transfusion being only transient. In the meantime the mother's blood had been processed by Miss B. E. Dodd, who reported that it contained antibodies to the Rh factors C and D.

On April 5, to cross-check this finding, the baby's blood was now genotyped and found to be Rh-negative. Also, the ABO group, which was put up as a routine, was O, with neither α nor β demonstrable in the serum.

Results were the same on April 7, except that weak β was now present in the serum. This reversal of group with β in the serum was also confirmed by Miss Dodd on April 8, though at birth the baby had group-A Rh-positive blood.

From April 5 to 18 the baby slowly lost its red cells, the count falling from 4,700,000 to 4,280,000 per c.mm. On the 18th the peripheral blood-cells were group O, with β in the serum, and there was a trace of agglutination with anti-D serum. In the marrow, on the other hand, the cells were group A and Rh genotype CDe, cde.

As marrow smears at this stage showed only 2·5% of primitive red cells, it was apparent that the repeated transfusions were producing a condition of red-cell hypoplasia, and further transfusions were withheld in the hope that the marrow would be stimulated to make its own cells.

On April 25 the peripheral red cells were grouped as A, with a good anti-D reaction but no agglutination with anti-C serum. On the 27th the blood-count had fallen to 3,530,000 per c.mm., and the blood antigens were A CDe, cde, a formula corresponding to that in the marrow.

These results are summarised in the accompanying table. Since then, the marrow has produced 12% of normoblasts, and the red-cell count is slowly rising. In the meantime the father, group A, has been genotyped as CDe, cDE.

CHANGES IN THE BLOOD

Date	Antigens present	
	Blood	Marrow
Feb. 25 ..	A Rh +	..
April 5 ..	O cde, cde	..
April 6 ..	O cde, cde	..
April 7 ..	O cde, cde	..
April 18 ..	O cDe, cde	A CDe, cde
April 25 ..	A cDe, cde	A CDe, cde
April 27 ..	A CDe, cde	A CDe, cde

DISCUSSION

It is clear from the twelve normal controls that the bone-marrow red cells contain the same hæmagglutinogens as do the peripheral cells. Also, the case illustrated demonstrates that, where frequent transfusions have been given, the marrow cells, being in a sense fixed, may reveal the true antigens when the peripheral blood-group is either obscured or altered by donor cells.

In the present case there was no indication at birth to genotype the baby, which was merely recorded as Rh-positive. As the father was CDe, cDE, and the mother made anti-C and anti-D agglutinins, there cannot be much doubt that the infant was originally a CDe, cde, a typing confirmed by the marrow and to which the peripheral blood eventually reverted. As the father was not available when the baby's blood was giving an untrue picture, the marrow reaction gave valuable corroborative evidence about the type of agglutinins present in the mother's serum.

The behaviour of β suggests that the original antibody was obtained from the mother, its disappearance and reappearance coinciding with its obsolescence and the baby's starting to manufacture its own β.

The return of the antigens to the blood showed some odd features. That the Rh antigen was detectable before its ABO counterpart was probably due to the use of higher titre anti-Rh sera; but why D should reappear before C was demonstrable with high-titre serum is not so clear, if the fixity of antigens is accepted, and may be due to the fact that the factor D as a rule seems to be more readily agglutinable than either C or E.

I am indebted to Dr. Donald Paterson for access to the patient, to Miss B. E. Dodd for her help with the sera, and to Mr. G. W. Cecil for much technical assistance.

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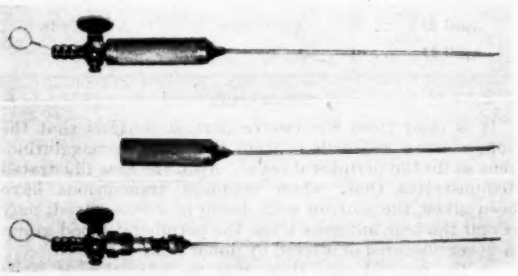
New Inventions

PNEUMOPERITONEUM-REFILL NEEDLE

THE induction of a pneumoperitoneum is much more difficult in most cases than that of an artificial pneumothorax, because, owing to the softness of the abdominal wall, it is extremely difficult to be certain when the point of the needle is within the peritoneal cavity. Again, in the pleura a good negative pressure is usually found, except when the pleura is adherent, whereas in the peritoneal cavity the pressures are often difficult to record because: (1) they are not so great as in the pleural cavity, and (2) a loop of intestine or a piece of omentum may obstruct the hole in the needle.

The needle described was designed by Veress, in Switzerland, to get over these difficulties. It is extremely simple to use and very efficient. The point of the needle is formed by a strong, hollow, but blunt trochar running within the needle, with an exit hole at one side, just below the blunt end of the trochar. The distal end of this trochar is fitted with a spring so that it projects about 1 mm. beyond the point of the needle, but can be withdrawn within the needle, being pushed out again by the spring when released. When the needle is pushed through the tissues of the abdominal wall, the blunt trochar is pushed back against the spring, and the cutting edge of the needle, within which it runs, pierces the tissues easily, the spring pushing the blunt trochar forward as soon as the peritoneal space is reached, displacing the gut or omentum in front of it, but not damaging it, as the trochar is blunt. A swing on the manometer may or may not be recorded, but it is quite



Above, the needle assembled for use. Middle, the cannula. Below, the spring and trochar.

safe to allow air to run in at this stage, at the end of which the pressures will be easily recorded.

The technique in actual experience is helped by the following suggestions. After anæsthetisation of the skin and parietal peritoneum in the usual way, the needle is inserted much more easily if a small nick is made in the skin just medial to the lateral border of the rectus at about the level of the umbilicus. As the needle is pushed forward, the blunt trochar is pushed back against the spring as it pierces the external fascial layer of the sheath of the rectus abdominis, but springs forward as soon as this is pierced. As the needle is pushed forward slowly, the blunt trochar is again pushed back as the internal layer of the sheath of the rectus abdominis is encountered, the trochar springing forward again when this is pierced. These two movements are important to observe and are much more easily detected if the patient raises his head from the couch, thus contracting the rectus abdominis while the needle is being inserted.

The original needle obtained from Switzerland is somewhat large; so the size has been reduced by the Genito-Urinary Manufacturing Co. Ltd., but the principle is exactly the same.

It is interesting to note that about 1925 G. Zorraquin, of Buenos Aires, designed a needle which was almost identical with this and was made by the Holborn Surgical Instrument Co. Ltd. for the exploration of the chest in cases of pleural effusion, so that fluid could be obtained without damaging the underlying lung.

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Reviews of Books

Technical Minutiæ of Extended Myomectomy and Ovarian Cystectomy

VICTOR BONNEY, M.S., M.D., F.R.C.S., consulting gynæcological and obstetrical surgeon to the Middlesex Hospital and consulting surgeon to Chelsea Hospital for Women. London: Cassell. Pp. 282. 30*s*.

THIS, the latest and probably the best book from the pen of Mr. Victor Bonney, is the gospel of the apostle of conservatism. In it, with the utmost simplicity of language and great clearness of detail, he explores almost every possible way of performing multiple myomectomy. Mr. Bonney takes his reader and imaginary pupil by the hand and leads him into the theatre and demonstrates each step in each type of operation. The 241 illustrations, drawn by himself, are in the same style as those of the famous *Textbook of Gynæcological Surgery*—little masterpieces of exposition. All gynæcologists and surgeons likely to perform myomectomy should have this book.

The 1945 Year Book of Neurology, Psychiatry and Endocrinology

Edited by HANS H. REESE and MABEL MASTEN; NOLAN D. C. LEWIS; and ELMER L. SEVRINGHAUS. Chicago: Year Book Publishers. Pp. 720. 18*s*.

SERVICEABLE and comprehensive, this triple volume devotes four-fifths of its space to neurology and endocrinology (almost equally divided) and a fifth to psychiatry: clearly the editors consider that a high proportion of the voluminous literature of psychiatry adds nothing to our knowledge. It is consequently regrettable that space is allotted to reflective or expository articles, such as "viewpoints on basic problems of psychopathology," "relationship of psychoanalysis to psychiatry," "psychiatric problems in obstetrics and gynæcology," which contain little that is new. In the neurological section the editorial notes are frequent and helpful; special attention is drawn to the meningeal responses to intrathecal medication, and the advantages of giving penicillin otherwise than by this route for the treatment of meningitis. The section on endocrinology is the last which Professor Sevringhaus will edit; in a prefatory note he compares the situation in 1934, when he began the series, and now: great advances have been made, but fundamental relationships have not changed, and there are still conspicuous gaps—for example, in our detailed knowledge of the mechanism of the menstrual cycle and of the hormones of the pituitary. This section is, as ever, the most thickly packed, and bespeaks the great if uneven activity in this field that prevails in American laboratories and clinics, from which come most of the papers abstracted. The value of the yearbook would be enhanced if the index were more itemised.

A Practical Handbook of Midwifery and Gynæcology

(3rd ed.) W. F. T. HAULTAIN, M.B., F.R.C.O.G., obstetrician and gynæcologist to the Royal Infirmary, Edinburgh; CLIFFORD KENNEDY, M.B., F.R.C.O.G., assistant gynæcologist to the infirmary. Edinburgh: E. & S. Livingstone. Pp. 388. 20*s*.

THIS handy synopsis of obstetrics and gynæcology represents the teaching of the famous Edinburgh school and it will therefore have a wide appeal north of the Tweed, but English readers will find the book equally acceptable to southern examiners. Though primarily written for the student about to qualify, it is also a useful book of reference for the busy practitioner who wishes to check up on some point quickly. The chapters on the infant and on breast-feeding are particularly good and the chapter on sexual disorders is useful and contains a small section on contraception. Not all will agree with the view that chloroform is the best anæsthetic when absolute uterine relaxation is required for difficult rotation or version, but the authors make the claim with various laudable reservations. The Edinburgh school, to be sure, are masters in the administration of chloroform; but the English schools are not, and until its use is excluded from obstetrics, some pregnant women will have their lives endangered every year. There are other anæsthetics available which are safer and equally efficient.

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THE LANCET

LONDON: SATURDAY, SEPT. 21, 1946

Occasion for Thrift

OUR Armed Forces, it is clear, are to be maintained at a substantial strength in peace-time; but though Service claims must be met in peace as in war they can no longer have exclusive priority. Other tasks of almost equal urgency lie ahead: the country's damaged economy must be repaired, and the Government has pledged itself to improve the life and lot of the people. If these purposes are to be fulfilled our supply of skilled man-power must be carefully husbanded and wisely allocated between the various claimants. Thus the medical profession must meet the higher peace-time requirements of the Services while helping to man the new National Health Service, which will ultimately call for more doctors than the country now possesses. Plainly, more doctors must be trained; the universities are alive to this fact,[1] but they cannot promise any large increase within the next few years. Meanwhile, the best use must be made of existing resources. In these straits, an authoritative body is needed to balance the claims of civilian and military medical services and satisfy itself that no doctor is wastefully engaged in either. Since its establishment during the war, the Medical Personnel (Priority) Committee has concerned itself with exactly these questions. The committee's importance will be undiminished in the days of peace; indeed, its brief should be extended and its membership enlarged to represent all interested parties. Its duties should, as now, be advisory, and, like other official committees that are in the making, it should publish its findings.

There will be plenty of work for the committee. It might first consider the proposal that medical students shall continue to be called up for military service, except when specially deferred, before starting their medical course proper. The alternative system, by which doctors would normally do their military training after qualifying, would require close understanding between the Ministries of Labour, Education, and Health, and the universities and Service departments; and it could not be effected immediately since the medical schools already have more candidates than they can accept from the ranks of the demobilised. But in a year or two the change should be practicable, and it is not too early to plan for that time. Many students would prefer that the break, if break there must be, should come between school and university rather than later; but will it not be more profitable for both the community and the individual if the doctor serves after qualifying, when he can help to reduce Service demands on the country's restricted supply of medical men and can gain the knowledge of Service medicine which he will need if ever he is recalled to the Forces?

Then there is the step which many think inevitable—the merging of the medical branches of the three Fighting Services into a single organisation, no longer keeping itself aloof from civilian medicine but closely linked to the National Health Service. This measure would provide doctors in the Forces with an opportunity for widening their experience and might well increase the efficiency of medical care for all fighting men; but above all would be its saving in overlap and hence the economy it would effect in hospitals, equipment, and man-power. This step was advocated early in the war by MEDICUS, M.P.,[2] after a tour of the B.E.F., and now, as then, the need is for a unifying authority. The Personnel Committee would be well constituted to study this scheme in detail and to advise on its practicability.

There is a further aspect of economy that should not be overlooked: time spent with the Forces should be profitably occupied. And here again is an opportunity for the integration of military and civilian medicine which we have already discussed in detail.[3] The late war proved the eagerness of the young medical officer, even under difficult conditions, to enlarge his experience. This thirst for further knowledge was to some extent recognised and appeased by short courses and clinical meetings in hospitals; during the last campaign in Europe one hospital (known, with a levity that concealed respect, as the University of Duffel) won a reputation for teaching that might be the envy of established centres. In peace-time this field can be more fully explored (see p. 432). It may be found that some of the best teachers have returned to civilian life, and certainly much will depend on the good will of civilian hospitals. The Services, for their part, may look with favour on a suggestion which is calculated to increase their appeal and efficiency. The newly recruited medical officer must first serve with a battalion or in a comparable post with the other Services, for this work calls for a special knack that is not learnt overnight. Moreover, better than any other appointment, it teaches the precise functions and effects of Service medical practice; indeed, many of those who joined the Forces for the duration as specialists suffered a permanent disability through not having held these posts. But training should also include opportunities to work in military medical units, large and small, and even in administrative offices. This arrangement would not only benefit the Services by instructing men in their operation but might also, by providing first-hand experience of many branches of medicine, enable junior graduates to return to civilian life with a better idea of where their bent lay.

Service with the Forces should not be divorced from, or delay advancement in, civilian work, but should rather be a normal phase in a single career. It may be that in the years to come the young doctor will be able to count his time in the Forces towards seniority in the National Health Service, and that senior men will be free to return to the Services for short periods without jeopardising their civilian position; they might, if specialists, thus help to make good a deficit that will probably be felt even more strongly in the Services than in civilian practice. Such a correlation may have to wait on more settled days; but economy in the use of doctors cannot wait.

1. See *Lancet*, August 31, p. 305.

2. *Ibid*, 1940, i, 987.
3. *Ibid*, 1945, ii, 531.

Surgery in the Aged

THE defeatism to surgical diseases in the aged is passing. The view of operation on the elderly as a desperate expedient is still reflected in the undue proportion of old people with acute surgical complaints to be found in institutions for the chronic sick; but the E.M.S., by sending doctors from voluntary hospitals as emergency staff to these institutions up and down the country, has influenced surgical opinion on the illnesses of old people. Many surgeons have returned to voluntary hospitals with an increased respect for the tolerance of the elderly for major operative procedures. The improved expectation of life means inevitably that surgeons will be increasingly occupied with patients over 60.

As TANNER [1] remarks, the improved results are not so much due to changes in technique as to better pre- and post-operative care and a higher standard of anæsthesia. The old patient's knowledge of dietetics is rarely profound; he is often faddy, practising self-imposed restrictions, especially on protein foods, green vegetables, and fruit. Rationing difficulties and poverty have usually added their burden. A preliminary period in hospital before operation, when surgical circumstances permit, is well spent; WHIPPLE [2] has pointed out the need for extra proteins to increase the powers of wound healing, and STEVENSON, WHITTAKER, and KARK [3] have found powdered milk useful for this purpose. With syrup flavourings it can be made into a palatable drink, and should be given between meals, say at 10 A.M. and 2.30 P.M., in 8 oz. feeds, and a further 16 oz. as a milk-shake at 9 P.M. By this means 72 g. of protein and 1100 calories can be added to the daily diet. It seems unnecessary to give amino-acids. Extra vitamin C is needed for the formation of collagen fibres,[4] and many of these old patients bear the stigmata of vitamin-B deficiency; so vitamin supplements in full doses should be added to the diet. The hæmoglobin needs watching, for many of these old people are anæmic; this is best corrected with iron, or if need be liver, for blood-transfusion requires particular care, since their hearts will not tolerate much overloading. Bed is a dangerous place for the old man; as often as not rest in bed, rather than the surgeon, is responsible for a pulmonary embolus. This is a complication ever to be feared in the aged, and in some operations a preliminary double femoral ligation, as is being increasingly practised in America, might be advisable. Just before operation is not the best time to change the habits of a life-time, so enemas and purges are better avoided. Smoking should be restricted for 48 hours before operation, but it will do no good to cut off the pipe after meals and have the patient fumbling, restless, and miserable. Morphine, when indicated for pain, should be given in small doses. HARDY, WOLFF, and GOODELL [5] have shown that the maximum analgesic effect is obtained with gr. $^1/_6$, and that a larger dose merely depresses respiration. The patient who requires pre-operative gastric lavage should have his washout first thing in the morning and just before the evening meal; the usual practice of leaving the stomach empty for the night robs the patient of the benefit of the night's absorption of food and fluid.

Of all the anæsthetics for the aged, local injection, with the patient preferably asleep (at any rate for the Englishman), seems to be the most satisfactory; spinal anæsthetics, especially high spinals, are badly tolerated by old people. Gas and oxygen is probably the most dangerous, for any sustained cyanosis is lethal. Light cyclopropane is almost certainly the safest. The old patient should not be intubated as a routine; when the patient is light this leads to much bronchial spasm, and, as NOSWORTHY [6] has pointed out, this may largely be responsible for subsequent lung collapse. Postoperatively, intravenous drips are better avoided; with a small catheter at least 5 pints of fluid a day can be administered by rectal drip. Protracted gastric aspiration is badly tolerated, and it is often maintained unnecessarily long after abdominal operations. Although his tissues heal well, and the peritoneal cavity does not seem to lose its power of coping with any mild spilling, the old person's resistance to infection is always poor, penicillin, preferably started before operation, is a valuable weapon against wound sepsis, which may spread into the peritoneal cavity and be responsible for the subsequent peritonitis. To avoid the unpleasantness of repeated injections, penicillin may now be given in 100,000-unit doses, and Dr. FLOREY and her colleagues demonstrate in this issue (p. 405) that such a dose given thrice daily will maintain a bacteriostatic concentration in the blood. Prophylactic sulphonamide therapy TANNER thinks is of definite value against pulmonary and peritoneal infection; he quotes a series of 120 unselected partial gastrectomies with one death, and attributes part of this success to sulphonamides. Sulphamerazine may come to be the drug of choice, for it has the advantage of requiring only 8-hourly administration and its conjugated form is relatively soluble in neutral and acid urine, thus avoiding the risks of drug concretions and damage to the renal parenchyma.[7] Succinyl sulphathiazole has proved its value in the preoperative preparation of the patient for intestinal surgery; in appendicitis, so treacherous in the aged, it may be used as an added safety factor. For diverticulitis, often seen in the aged, phthalyl sulphathiazole, which requires but a daily dose of 3–6 g., may be superior.

In the decision to operate on an old person the surgeon should not be too much influenced by the knowledge that the patient's blood-pressure is high; even a history of coronary thrombosis is no absolute contra-indication. Hypertension was present in 77% of 341 "healthy" Chelsea pensioners examined by HOWELL.[8] "Give me preferably the old patient with high blood-pressure," GORDON-TAYLOR has remarked. Fall of pressure in the aged is a bad prognostic sign, and when "systolic figures approach 110, the outlook is grave." [8] The surgeon should bear in mind that hæmoptysis, hæmatemesis, and profuse rectal bleeding may result from hypertension rather than local disease. Gastric surgery for ulceration is now being increasingly performed with success in old people. Gastric perforation is by no means rare in the higher

1. Tanner, N. C. *Brit. med. J.* 1943, i, 563.
2. Whipple, A. O. *Ann. Surg.* 1940, **112**, 481.
3. Stevenson, J. A. F., Whittaker, J., Kark, R. *Brit. med. J.* 1946, ii, 45.
4. Hunt, A. H. *Brit. J. Surg.* 1941, **28**, 436.
5. Hardy, J. D., Wolff, H. G., Goodell, H. *Amer. J. Physiol.* 1940, **129**, 375.
6. Nosworthy, M. D. Quoted by Mimpriss, T. W., Etheridge, F. G. *Brit. med. J.* 1944, ii, 466.
7. Henderson, J. *Surg. Gynec. Obstet.: int. Abstr. Surg.* 1946, **83**, 1.
8. Howell, T. H. *Practitioner*, 1946, **156**, 444.

age-groups, and TANNER has seen it even at 91; it seems certain that this diagnosis is often overlooked. For the old patient with ulcer, gastrojejunostomy is sufficient, for the mucosa is usually degenerative and ulceration does not recur. The stomach growth, of course, does require partial gastrectomy, and it is amazing how well the aged withstand this procedure. TANNER records a successful total gastrectomy in a patient of 74, and WAUGH and GIFFIN [9] one in a patient of 72. In such patients preliminary splanchnic block may be dangerous, for, especially with the anterior approach, pressure on the aorta may fracture some of the atheromatous plaques usually present. Resection of œsophageal growths is now being successfully performed even in old patients, and the risks are worth taking. The pharyngeal pouch quite common in the aged is being dealt with under local anæsthesia by first transplanting the pouch to a higher level and at a second operation coring out the mucosa. Growths of the colon can be expeditiously dealt with by Paul's operation, and even if there are secondaries in the liver an attempt should be made to remove the local growth. Patients with secondaries in the liver often live for two or three years in fair comfort and removal will spare them the misery and pain of the local spread. The aged do not always need the full abdomino-perineal resection; where the growth is at the pelvirectal junction, or high in the rectum, the simpler operation of leaving a distal blind rectal stump (Hartman's operation) is ample. CUTHBERT DUKES,[10] and GLOVER and WAUGH,[11] have shown that distal retrograde spread is slow, and that it only occurs in 1% of cases, and then usually only when the normal upward channels have been blocked. Section of the bowel an inch below the palpable edge of the lesion will satisfy pathological requirements. The breast carcinoma usually needs but a local amputation to avoid the local ulcerating mass, and to remove what the patient knows perfectly well is slowly whittling away her life. Admittedly, such carcinomas are often extremely slow growing, but, with the ever-extending propaganda on cancer of the breast, no patient can dismiss it lightly from her mind. Minor operations, even circumcisions, are often necessary in old people and should not be shirked. Hæmorrhoidectomy can easily be performed under local anæsthesia. The frail old lady withstands well an operation for procidentia, and it will give her comfort. As HOWELL astutely remarks, "trifling matters often distress the aged more than great ones."

The possibility of a vascular catastrophe alway hovers over the old patient. Embolism of a mesenteric or peripheral vessel is a condition amenable to surgery, and has to be borne in mind. The peripheral embolus is too often overlooked till too late for surgery; numbness and loss of power, rather than pain, may be the chief symptoms. The limb with a peripheral embolus, if operated on early (usually under local anæsthesia), does well. Arteriosclerotic gangrene is now being treated by more conservative methods; gangrene of a single toe often ends with no more than loss of the superficial skin. Reflex vasodilatation,[12] by heating the body or immersing the opposite limb in water at 110° F, is probably the best way of encouraging the collateral circulation; it does as much as a sympathectomy and certainly more than vasodilator drugs. For the frail patient, particularly with spreading gangrene, amputation under ice anæsthesia has a place. The results of surgery in the "old man's illness"—prostatic obstruction—have been much improved; Millin's retropubic operation has largely justified the original optimism. The other old person's disease, trigeminal neuralgia, is being increasingly operated on early, and these patients withstand the operation remarkably well. Fractured neck of femur, which was the harbinger of death for many of the aged in the past, is now almost routinely treated with the trifin nail—a procedure which even the very old withstand well. Aseptic necrosis and extrusion of the pin have rather damped initial hopes, but a good result can usually be anticipated in at least 50% of cases; where this fails McMurray's osteotomy is extremely valuable.

One example of the success being attained must suffice. CARP [13] has collected figures from a variety of sources covering 2558 patients submitted to operation at ages over 60; these show an average operative mortality of 13·1%—a gratifying result. It does indeed seem that the age of the "lean and slippered pantaloon" may become a less formidable problem to the surgeon than that of the "fair round belly with good capon lined."

9. Waugh, J. M., Giffin, L. A. *Proc. Mayo Clin.* 1941, **16**, 363.
10. Dukes, C. E. *J. Path. Bact.* 1940, **50**, 527; *Proc. R. Soc. Med.* 1941, **34**, 571.
11. Glover, R. P., Waugh, J. M. *Surg. Gynec. Obstet.* 1946, **82**, 433.
12. Learmonth, J. R. *Edinb. med. J.* 1943, **50**, 140.
13. Carp, L. *Ann. Surg.* 1946, **123**, 110.

Annotations

DENTAL CONTROVERSY

THE dispute between the dental profession and the Minister of National Insurance raises an important point of principle. Negotiations for a new scale of fees for dental work done for insured persons began as long ago as January of this year, when the Dental Benefit Council set up a negotiating committee consisting of three dentists, representatives of three approved societies, and a number of Government members. This committee issued a questionary to more than 1000 dentists engaged in N.H.I. practice to ascertain (*a*) to what extent the cost of running a practice had risen owing to the war, and (*b*) what were the private fees charged to non-insured patients in the same walk of life as those treated under N.H.I. The committee issued a unanimous report and submitted a scale of fees which represented an average increase of about 100% over the pre-war scale. This scale of fees has now been rejected by the Minister of National Insurance. The dental profession feels that having exhausted what it regards as the normal negotiating machinery it has no alternative but to abstain from participating in the service. The dental profession fears that if the present Minister is prepared to disregard negotiating machinery in connexion with dental benefit in this way, and to rate the value of a dentist's services so low, there can be no hope of any better treatment in a scheme applying to the whole nation.

The scale which the Minister proposes to adopt from Sept. 30 will yield an average net increase of 50% over pre-war, according to the Ministry's letter circulated to dentists on Sept. 12, but the rise is not uniform. Thus the fee for full upper and lower dentures, which unfortunately is the form of treatment most necessary for working-class patients, is £7 15*s*. When the scheme started in 1926 this fee was £6; the present fee is £6 7*s*. 6*d*.; and the dentists were prepared to accept 9 guineas. The dentists contend that they cannot

guarantee a satisfactory service for insured persons at any scale below that which the Minister rejected, and the Joint Advisory Dental Council recommends dentists to refuse to undertake N.H.I. work unless the higher scale is adopted.

PERCEPTION

THERE are many subjects of common interest to philosophy and medicine: but if he is a physician the Manson lecturer, required by the terms of his appointment to consider some such subject, may well doubt his ability to reach the standard of subtle and recondite profundity manifest in philosophical writings. Dr. Russell Brain [1] has, however, succeeded in illuminating a problem of basic importance for the philosopher—the nature of perception, especially in its causal aspects. Neurologists, he points out, usually adopt physiological idealism as their epistemological theory: for them the only independently necessary condition for the awareness of sense-data is an event in the cerebral cortex. But, besides the familiar arguments against idealism, it is possible to object to this, as Russell Brain does, that the peculiar phenomena of cortical representation during visual perception make simple "projection" of cerebral events an inadequate explanation: "when we perceive a two-dimensional circle we do so by means of an activity in the brain which is halved, reduplicated, transposed, inverted, distorted and three-dimensional." But realism too has its difficulties, implicit in Brain's (probably rhetorical) hope that a realist philosopher will give an account of the "ontological status of a black sense-datum when it is not being perceived and, in particular, its relationship to its non-existent substratum in the physical world."

By way of hallucinations and the phenomenon of "phantom limb," which further illustrate this crux, Brain passes to the rôle of the body in perception, and instances a number of observations hard to reconcile with any variety of critical realism. Awareness of externality is clearly the cardinal problem: and spatial relations, upon which this depends, are primarily perceived in a somatocentric way. The body is well adapted to the task of spatial discrimination, through its apparatus for the integration of impulses conveyed from different sense-organs to the cerebral cortex. Russell Brain holds that the most likely explanation of the relationship between sense-data and the nervous system is that a sense-datum is a neural event which is conducted from the surface of the body to the surface of the brain but which carries with it some characteristic of the physical stimulus which excited it. In his conclusion, which takes account of the "successiveness" of the stimulus event, he adopts a realist position in so far as he denies that even secondary qualities are generated by our brains or minds: "in sensing them we are perceiving the four-dimensional texture of the external world." This is a thoughtful and stimulating essay which shows how significant for the philosopher can be the observations and reflections of the neurologist.

DEATH AFTER CURARE

AN inquest was held at Hammersmith on Sept. 9 on a patient who died after an operation in which curare was employed. A woman of 70 years had been admitted to hospital two days after the onset of symptoms of acute appendicitis. An hour after receiving morphine gr. $^1/_6$ and atropine gr. $^1/_{100}$, she was anæsthetised with 'Pentothal' 1 g. and was given 'Intocostrin' 9 c.cm. Oxygen was administered during the operation, which revealed an acutely inflamed but unruptured appendix, with much induration of the surrounding tissues and a small adjacent collection of pus. The appendix was removed, the pus mopped out, and the wound closed in layers. The first alarming signs—cyanosis and shallow respiration—appeared after the end of the operation, which had taken 43 minutes. The patient recovered somewhat with oxygen and carbon dioxide, but relapsed and, despite the injection of 'Coramine' 1 c.cm. and 'Veritol' 1 c.cm., died 35 minutes later. Necropsy confirmed the presence of early peritonitis, which was most pronounced in the right iliac fossa; there was some dilatation of the terminal loops of the ileum, suggesting early paralytic ileus. The left lung was almost completely collapsed and there was considerable collapse of the posterior halves of the right upper and lower lobes; there were one or two adhesions in both pleural cavities and the lungs showed pronounced terminal congestion. The heart muscle was a little friable, but only early atheromatous changes were found, and there was no valvular disease. Early toxic changes were seen in the spleen and liver. The kidneys were remarkably healthy for a patient of this age, although albumin had been found in the urine before operation. The pathologist considered that death was due to toxæmia and had been accelerated by respiratory failure due to curare. A verdict of death by misadventure was returned.

PENICILLIN IN WOUNDS

THE topical application of sulphonamides to wounds has proved a disappointment, and, though there is not unanimous opinion on this point, it is widely held that the presence of a sulphonamide powder in a flesh wound may actually delay healing. In sharp contrast to this, there has never been a doubt that penicillin as a topical application is of great value, for it has the advantages over the sulphonamides that it acts in the presence of pus, that its effect is not weakened by large numbers of bacteria, that it is a much more powerful bacteriostatic agent than any sulphonamide, and that it is very soluble in tissue fluids. In the early stages of its use, penicillin was recommended as a topical application because this method was more economical than systemic administration at a time when supplies were short; and many surgeons believed that, valuable as it was used thus, its effects would be greater still when easement in the supply position permitted free systemic administration. This belief has not been borne out in practice, and the paper by Florey, Turton, and Duthie in this issue gives scientific foundation for the clinical impression that locally applied penicillin is as effective in preventing wound infection as it is when given parenterally.

Florey and her colleagues collected samples of wound exudates after penicillin had been given either by local application or by injection. The difficulties they encountered in the assay of the penicillin content of these exudates and the methods they used to overcome them need not detain us here. It was shown that whereas 100,000 units of penicillin injected intramuscularly yielded for a minimum of 8 hours a wound exudate which inhibited the test organism, a similar dose implanted in the wound yielded exudates with inhibitory concentrations for at least 48 hours. It might be argued from this observation that locally implanted penicillin remained in the wound cavity but might fail to reach organisms lying in the wall, but this argument is defeated by observations on the duration of inhibitory activity in the blood and urine. There was little difference in the time over which inhibitory levels were maintained in the blood whether penicillin was given locally or parenterally, but in the urine inhibition persisted in half the cases for twice as long after local application as it did after intramuscular injection. Penicillin is therefore readily absorbed from wounds and must traverse the walls of wounds (inhibiting meanwhile organisms lying in its path) to gain access to the blood and urine.

All this is of great importance in its practical application to wound treatment. Locally implanted penicillin is of

1. Neurological Approach to the Problem of Perception. *Philosophy*, July, 1946, p. 133.

greater value, unit for unit, than injected penicillin in the control of wound infection—a conclusion which all patients will welcome if it means that the 3-hourly injection régime can be avoided. It is clear, also, that so far we have not put nearly enough penicillin into the wounds we have treated and have therefore had to waste it by supplementary systemic administration. Some practical points await elucidation. Can one put into a wound a large enough dose of penicillin to sterilise it with certainty at a single stroke? Do the tissues show a marked resentment to pure powdered penicillin in quantity, and would healing be impeded by excessive exudation? If a single sterilising dose proves impracticable, what is the best method of implanting penicillin into a sutured wound at, for example, 24-hourly intervals? It seems that despite the vast experience of the past six years, the last word on the best method of treating wounds with penicillin has yet to be said.

TEST FOR THREATENED ABORTION

THE presence of pregnandiol in the urine can be determined qualitatively by a colour reaction which is neither particularly involved nor time-consuming; and Guterman [1] now claims that this can be used as a diagnostic test for pregnancy with an accuracy comparable to that of the Friedman test. He suggests, moreover, that the reaction is an accurate aid to prognosis in certain complications of pregnancy, notably threatened abortion.

Pregnandiol is the excretion product of progesterone, and it appears in the latter half of the cycle, ceasing one to four days before the onset of menstruation. If fertilisation occurs the corpus luteum persists and the excretion of pregnandiol continues. In normal pregnancy the excretion of pregnandiol follows a fairly well-defined pattern. At first it is comparable to that in the latter half of a normal menstrual cycle, but about the ninth to twelfth week the excretion rises sharply to reach a peak two weeks before delivery; it then drops sharply, and pregnandiol has completely disappeared from the urine twenty-four to forty-eight hours after delivery. It is well known clinically that the corpus luteum begins to degenerate about the third month of pregnancy, after which double oöphorectomy can be carried out without necessarily disturbing the pregnancy. It is probable that the placenta assumes the function of secreting progesterone from about the twelfth week onwards; and the commonest time for abortion corresponds to the stage at which the corpus luteum is regressing and the placenta is beginning to take over its function. During this transitional period pregnandiol excretion is liable to drop to a low level; and a drop into the danger zone may well herald the onset of threatened abortion. The test could thus forewarn the clinician, who could take evasive action by ordering rest, sedative drugs, and possibly progesterone by injection.

Guterman's colour reaction [2] consists briefly in adding concentrated sulphuric acid to the pregnandiol extracted from the urine; a positive reading is indicated by a deep yellow or orange, which represents 0·4 mg. pregnandiol per 100 c.cm. of urine, or roughly 6–10 mg. in twenty-four hours—the normal amount in early pregnancy. He studied 73 patients with threatened abortion; among these the pregnandiol colour reaction with concentrated sulphuric acid was persistently negative in 39, of whom 38 aborted. The reaction was persistently positive in 34, of whom 30 did not abort. Out of the 73 there were 5 wrong prognoses; but in 3 of the 4 positives that aborted there was good reason for it—placenta prævia in two and a large fibroid in the third. The test is most useful up to the third month. Thereafter with the excretion of pregnandiol rising from 20 mg. to 50 mg., a positive reading may persist for the first twenty-four hours after fœtal death. Guterman offers no explanation of the pregnancy which continues despite a persistently negative colour reaction. The great advantage of the method is its cheapness and speed; a result can be obtained on the day that the specimen reaches the laboratory. It is hoped that English workers will try it out; if it is found to be as good as Guterman claims, it should prove useful in the treatment and prognosis of threatened abortion.

1. Guterman, H. S. *J. Amer. med. Ass.* 1946, **131**, 378.
2. *J. clin. Endocrin.* 1944, **4**, 262.

HOSPITAL CATERING IN MIDDLESEX

BY way of experiment, the Middlesex County Council have decided to appoint a catering officer to one of their hospitals.[1] The appointment is in the first instance to be temporary, though not with any fixed limit of time, and is to carry a salary of £750 a year, rising by annual increments of £25 to £850. In a report to the public-health committee, Dr. H. M. C. Macaulay, county medical officer of health, notes that existing arrangements present many of the drawbacks discussed by King Edward's Hospital Fund for London.[2] Thus hospital catering comes under the dual control of the steward, who undertakes the buying and supervises the porters who distribute the food to the wards, and the matron, who supervises both the kitchen staff and the nurses. The matron may have the help of a housekeeping sister, whose short course of training, planned in days when hospitals were smaller, is mainly administrative, does not include cooking, and seldom covers nutrition or the relation of food to health.

Dr. Macaulay found the matrons ready enough to be relieved of the responsibility of catering; but the stewards, though agreeing that it should be under one person, were uneasy over the proposed appointment of a catering officer. They feared the results of divided control of staff, especially porters, and of stores, since food would have to be separated from other goods; and they concluded that the person responsible for catering should either be the steward or else that the catering officer should work under him.

It is doubtful whether this is the right arrangement. As the King's Fund point out, stewards have little expert knowledge of food, cooking, and the science of nutrition, and their general administrative duties do not leave them time to visit markets and interview travellers. They have to depend on the long-term contract, the written order, and the telephone in buying food; Dr. Macaulay, in fact, noted that the contract purchase was much too common. Yet a day-to-day first-hand knowledge of markets is needed for clever buying of seasonal foods, and a balanced diet can only be provided by a man or woman who understands nutrition and is free to juggle with the commodities at his disposal. Much, of course, must depend on the quality of the caterer appointed; experienced caterers are scarce, and until more have been found or trained it may be well to go cautiously. In deciding to appoint one catering manager, Middlesex County Council leave themselves free to experiment with stores arrangements and in other directions.

In addition, food service subcommittees are to be appointed in all the council's hospitals, made up of the medical director, members of the medical staff, and the officers responsible for hospital feeding, including the matron, and the dietitian and caterer where these exist. These committees will be able to reconcile the financial, medical, nursing, dietetic, and administrative interests concerned, and to deal with complaints about food. It will be interesting to see whether they develop on the lines set out by the King's Fund, as technical and

1. Report of the Public Health Committee to Middlesex County Council, July 31.
2. Second Memorandum on Hospital Diet, London, 1945.

professional committees, analogous to hospital medical committees, advising their hospital boards, and regularly consulted by them before any decisions are made to reduce expenditure on kitchen staff or provisions. Economies of these kinds can be expensive, whereas increases in kitchen salaries have on occasion been more than counterbalanced by savings on waste. The classic example is that published by the King's Fund in 1943 of a hospital which raised the total wages of kitchen staff from £1000 to £2000, and enjoyed a fall in the total costs of catering from £20,000 to £14,000.

TESTOSTERONE AND ANGINA PECTORIS

MEDICAL propaganda is not without its risks, especially in the hands of an enterprising journalist. Testosterone for angina pectoris is an example of a comparatively untried treatment which has been prematurely popularised in this way. In the U.S.A. many people with angina are said to be either treating themselves with the drug or urging their doctors to prescribe it. That its worth is as yet unproved is confirmed by the latest report from America. Levine and Sellers [1] gave 25 mg. of testosterone propionate intramuscularly twice or thrice a week and 10–15 mg. of methyl testosterone sublingually every day to 21 men with angina pectoris; 11 showed no improvement and only 2 showed "marked improvement." Of the 10 patients who had male climacteric symptoms (precordial discomfort) in addition to angina pectoris 6 reported that these symptoms were much improved. Other workers [2] have reported similar results—failure to relieve angina pectoris, but relief of chest symptoms attributed to the so-called male climacteric. There seems to be good reason for the conclusion of Riseman [3] that testosterone should be classed among agents of no value in angina pectoris.

SILICOSIS AND ALUMINIUM TREATMENT

LAST year we drew attention [4] to the patenting by Canadian investigators of the aluminium treatment for silicosis. It now appears that the patent does not apply to Great Britain and that research-workers in this country are free to experiment with the method. The subject has been considered by the councils on industrial health and on pharmacy and chemistry of the American Medical Association which in April issued the following report [5]:

1. In experimental animals the *prophylactic* use of aluminium inhibits the toxic action of relatively pure quartz.
2. In man, industrial dust exposures often involve mixtures of various minerals in addition to quartz and other environmental variables to which experimental animals are not subject. Therefore human silicosis usually develops more slowly and is often modified in type. Only prolonged unbiased observation, with adequate control cases, will demonstrate whether the prophylactic results obtained with animals are applicable to man.
3. Animal experiments have demonstrated that administration of high concentrations of amorphous hydrated alumina unfavourably influences resistance to tuberculosis. While this result has not yet been reported for metallic aluminium, caution in the application of all aluminium therapy to human beings is recommended.
4. The use of aluminium might appear as an easy short-cut to healthful working conditions, thus saving large expenditures for ventilation and other control methods. Actually there is no substitute for the accepted methods of dust control.
5. If industry indiscriminately treats all employees with aluminium dust there may be aggravation of tuberculosis or other pulmonary conditions.
6. The *therapeutic* use of aluminium in man appears to relieve symptoms in a very small number of cases in which silicosis develops rapidly. Experience in some groups is more favourable than in others.
7. In view of these considerations it is recommended that the general application of aluminium therapy in industry be delayed until adequately and impartially controlled clinical observation demonstrates its effectiveness in preventing or alleviating silicosis in man. In the meantime, there should be no slackening in the control measures that have been found effective in reducing the incidence of dust diseases in industry.

We agree heartily with this opinion and repeat that the "results of treatment and prevention of silicosis by the aluminium method, while suggestive, are not yet convincing, and much more work by independent and untrammelled observers is needed to establish its efficacy." We hope too that the freedom of this country from the effects of the Canadian patent will not result in the indiscriminate establishment of aluminium inhalation chambers at factories or other places where there is risk of silicosis. The only established method of preventing the disease is by seeing that workers do not breathe the dust of free silica.

FATE OF THE NERVE HOMOGRAFT

TRIALS by Seddon and Holmes [1] of nerve homografts for bridging gaps in injured peripheral nerves indicate that, despite its success in cats, rabbits, and monkeys,[2] the method is ineffective in man. Barnes and his colleagues [3] have also made a careful investigation of homografts in 8 cases of peripheral-nerve injury where the gap between the divided ends of the nerve could not be bridged by any other method; in no case was there any recovery of neural function. At varying intervals after insertion, when it was apparent that no recovery was occurring, the wound was explored and the graft inspected. In 3 cases the graft was removed and studied histologically 140, 355, and 904 days after insertion. In all 3 cases regenerating nerve-fibres crossed the suture line and penetrated the graft for varying distances, the greatest being 25 mm. In the graft there was necrosis of the fascicles and some fibrous replacement, the extent of which appeared to depend on the time that the graft had been in place; in the third case, examined at 904 days after insertion, there was dense fibrous tissue and no evidence of the original graft elements.

Barnes and colleagues point out that the reaction to a homograft differs fundamentally from the reaction to an autograft. The fibrous replacement of a homograft appears to be due to a reaction of the host's tissues; with an autograft the architectural characteristics of the graft are maintained, and fibrosis results from the proliferation of its connective-tissue elements. Why a homograft undergoes necrosis and fibrous replacement is still uncertain; Barnes and colleagues suggest that it is the result of "active acquired immunity"—a view originally expressed by Gibson and Medawar [4] in relation to skin homografts. Seddon and Holmes think that where the gap is short, as in the rabbit, the tissue reaction may not occur until outgrowing fibres have reached the peripheral stump, and that in man, where the gap may be long, the immune reaction attains its greatest intensity long before the fibres have had time to traverse the gap.

Until more is known about the mechanism and control of the host's acquired immunity, the nerve homograft will find no place in the surgery of peripheral-nerve injuries.

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2. Goldman, S. F., Markham, M. J. *J. clin. Endocrin.* 1942, **2**, 237. McGavack, T. H. *Ibid*, 1943, **3**, 71.
3. Riseman, J. E. F. *New Engl. J. Med.* 1943, **229**, 670.
4. *Lancet*, 1945, i, 441.
5. *J. Amer. med. Ass.* 1946, **130**, 1223.

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Reconstruction

HEALTH EDUCATION

ITS PROBLEMS AND METHODS *

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HEALTH education is a comparatively new subject. It has not yet been formulated in doctrine and pedagogic methods, as has been done with the older disciplines, such as botany and chemistry. To say this is not to disregard the work of those devoted medical men and administrators, such as Heberden, Fothergill, Smellie, Snow, and Chadwick and Simon, who laid the basis of scientific hygiene and gave it practical expression in public-health legislation.

The labours of the early hygienists involved convincing the public so completely that their discoveries were correct that the result was a general demand for legislative action and an acceptance of the laws when they were made. This meant instruction in the requirements for health, and it is the democratic method. But a glance at the history of preventive medicine or hygiene in modern times is enough to show us the main grounds for the claim that health education is a new subject.

The preoccupation of hygiene is with the prevention of disease—and very properly so—while the preoccupation of the new health education is with the promotion of health. The difference is that between a negative and a positive point of view. It is true that health education could not have developed as an idea without the prior creation of a firm foundation of preventive medicine, but it is an extension from the older concepts of the hygienists and sanitarians, and it has its separate contribution to make to national welfare.

The time seems ripe to attempt at least an elementary analysis of the general concept and to formulate principles for its further development. The following views are presented as no more than a hypothesis upon which a thesis may later be made. They are far from complete, but their purpose will be accomplished if they only act as catalysts to stimulate discussion among other workers in the field.

DEFINITION

It is of first importance in any discussion to be definite about the meaning of the terms used; so we must make a semantic examination of the word "health." This is not easy, for health is a state of being and, as a biological phenomenon, is in a continual condition of flux. Some time ago I looked up the definition of health in all the dictionaries and textbooks at hand, and could not find a single definition which satisfied the criteria laid down in formal logic. For example, to say that health is "wholeness or soundness of body and mind" does not really take one any further. At last it appeared that the method of classical logic was inadequate to supply the required answer. It was necessary to apply the logic of the continuum as, for example, used by Bogoslovsky.

For the purposes of this dynamic logic we will postulate that we can only consider health by also considering its opposite, disease. This pair of contrasting concepts may be regarded as opposite poles joined by a line along which we can measure the distance of any point from health at the one end, or from disease at the other. Any scale of gradations can be chosen. This is what is meant by a logical continuum. It is not a far step to see that the ultimate of disease is death and (applying the method of contrasting opposites) the ultimate meaning of health is life in the fullest and most complete and perfect sense of the word.

But a complication must be added if the model is to be adequate. Health and disease are not a simple pair of contrasting opposites like heat and cold. They are made up of immense numbers of components involving the body, the mind, and the spirit. Thus the imaginary line of the continuum becomes a rope of innumerable strands. At first sight this may seem a tortuous and perhaps pointless piece of speculation, but it does provide a basic model on which to found the reasoned structure of the principles of health education. We cannot indeed escape the necessity for such a model, and it is surely not contentious to hold that, if real advances in this subject are to be made, the pragmatic method, which has served its part, must be replaced by sound first principles.

Health, then, is a state which can be measured. In practice it is quite common to find approximate measurements being made. The medical examination of Service recruits, the much more exacting annual flying board for pilots, the life-assurance examination, and mass nutritional surveys are all examples of such approximations. These would all appear crude if compared to the total tests and measurements which modern medicine and psychology could apply, were there sufficient time and staff to do it. But they are enough for their especial purposes.

If a population large enough to give statistical significance is examined by such methods, a norm or average can be established which is a measure of the so-called "normal" health of the group within the limits of the measurements. But this is not to say that such a normal is the *best* or even a proper state of health for such a population. It is hardly necessary to point out that any such standard norm for a group selected from the British or any other people would fall far below the norm which could possibly be attained by attention to the rules of healthy living, good dentistry, complete nutrition, individual education in place of conveyor-belt methods, and so on. This is still true despite the enormous betterment in national health and fitness, expectation of life, stature, and the like, which have been brought about by preventive medicine in recent years—and which, we may well be proud to say, continued to improve during the war.

THE FIRST BASIC PRINCIPLE

It can be postulated, then, that such a norm of health exists for any population, and any deviation below this norm can be called negative, any deviation above, positive. The validity of this concept is demonstrated further by applying to the measurements a Gaussian curve, or indeed a frequency-distribution surface, although I shall not here extend this argument. But in the doctrine of positive health we have the first basic principle which is the essence of the new attitude in health education. It is that health is more than just the state of not being ill or of having no complaints or disabilities; moreover "ordinary" health can be improved, though preventive medicine alone is not enough. The idea of positive health indeed points the way to constant improvement. The fullest use and enjoyment of life is only possible through the fullest use and enjoyment of health. This is at once true of body, mind, and spirit, which leads to the second basic principle of sound health education.

THE SECOND

This is the principle of holism, which I have found best expounded in that most important book *Holism and Evolution*, by General Smuts. To put it in the simplest way, if we talk about man in the physical sense, everyone will agree they understand what is meant; but if we ask whether the term "man" includes

* A Chadwick lecture given in London on Oct. 30, 1945.

his mind, or still more his soul, the argument starts. Yet from the holistic point of view we must regard man as a triad of body, mind, and spirit, just as psychologists (of the classical school at least) treat the mind as a triad of will, emotions, and intellect. But these are coexistent and interdependent. They cannot be separated one from the other except for dialectic convenience. They are not autarkic entities, for this would deny the principle of solidarity. Similarly, a study of anatomy without some physiology, especially neurophysiology, would be completely meaningless; while physiology could not be studied at all without at least an elementary knowledge of anatomy, for structure and function are inseparably related. Taking this circle method of categorising one stage further, the life of man could be described as a complex of the vegetative, motor, intellectual, moral, and reproductive—and these merge at some points. Part of the reproductive life of man is vegetative, part of it is concerned with morals and so on.

The main point is that, while we admittedly sectionalise knowledge and observations, this is only a matter of convenience, a sort of intellectual shorthand. "Separate" sciences are really closely enmeshed together. Advances in one produce alterations in the others, and there is a fluid equilibrium between them. So, too, the health of man is a whole thing and conterminous with his life. In studying it this should always be remembered, though commonly it is disregarded. For example, there is the type of fallacy we may call unitarian, such as is held by the faddist who has a diet cure for all ailments, or the person who treats every ill as imaginary, the so-called Christian Scientist.

It is necessary, then, for health education to be concerned with more than the inculcation of habits of cleanliness, temperance, exercise, and the like. The old saw "*mens sana in corpore sano*" has its corollary, "*corpus sanum in mente sana.*" Equally it must be remembered that the moral outlook is intimately connected with the health of both body and mind.

THE THIRD

The third principle of health education is not easy to name satisfactorily, but for present purposes we may call it the principle of motive or aim. It is designed to provide the force or energy for carrying out whatever procedures may be necessary to obtain health. The principle shows that in planning health education it is not sufficient to instruct people how to improve their personal or community health. It is necessary at the same time to convince them that it is really worth paying the price in effort, time, and perhaps money to obtain these benefits. This may at first sight appear so obvious as to be out of place in such a discussion, but unfortunately this is not so. Ask anyone if they want to be healthy, and the unhesitating reply is that they do. If this question is followed by a supplementary query about what they are now doing to promote their health, the answer is seldom so prompt.

It is true that some people will reply that they brush their teeth after meals and take open-air exercises when they can, and so on, and, in an occasional instance, if one has chanced on a faddist such an inquiry may open floodgates of enthusiasm. But only an insignificant proportion of the population make any effort to improve their physical and mental health and efficiency, unless illness has brought home to them the handicaps of disease.

Health education, then, must not only instruct but also convince people that health is worth having. The fact is obvious, as everyone will admit; but it is one thing to accept the validity of a general statement intellectually, and quite another to accept it emotionally as well. If our instruction is to produce the best results, it must create converts to the idea and imbue them with the fervour usually associated with the phenomenon of conversion. The formula then is:

(1) health is worth having,
(2) ordinary health can be improved by the expenditure of effort, and
(3) the expenditure of this effort pays real dividends.

I do not apologise for hammering at this point, obvious though it may seem. It is a common enough experience for people to be fired by the enthusiasm of a physical-culture expert on the radio, or perhaps a writer in a women's paper who promises beauty, charm, and a handsome husband for, say, five minutes' deep breathing a day. The course of exercises or massage or whatever it may be is started at once and kept up with fervour for at least three days. How reminiscent this is of the parable of the seed that fell on stony ground.

THE FOURTH

The fourth principle of health education is that of use. We must use our faculties, or they gradually fade. The Indian fakir may hold his arm above his head for years, and the muscles atrophy and the joints ankylose so that he cannot lower it even should he wish. A small boy may attain some competence at the piano in three or four years and then give it up, only to regret as an adult that he is just able to pick out "Swanee River" with one finger. These are examples of atrophy and disuse.

Few people develop and use their physical and mental powers in the most efficient way, and improvement is nearly always possible. The fact that athletes train specially before a big event is evidence of this. One can learn to walk a tightrope, or perform the difficult gyrations of the ballet dancer, if one sets one's mind to it. This does not mean that everyone should practice acrobatics or aspire to dance "Petroushka." It is instanced as an example of how physical capacities can be expanded (naturally, variations in physical and mental endowments make some people more fitted for a given activity than others). It is equally true of the mental faculties, whether one tackles the solution of mathematical problems or the harder task of swaying the House of Commons by impassioned eloquence. A combination of application and practice will improve one's facilities for dealing with either contingency.

This principle can be taken a step further, for it must be applied equally to the soul. Admittedly this is an unsatisfactory terminology, but the point to be made is that no person is completely healthy unless he has a sound moral discipline. Whether this be entirely from without, or from the wells of a man's own conscience, or a combination of the two, is irrelevant. The essence of the matter is that this moral discipline must exist. It has been remarked with surprise that during the war there was a decrease in neuroses, and the anticipated increase of mental ill health did not develop. Though it is easy to fall into the fallacy of post hoc, propter hoc, I am convinced that this reduction sprang from the same origin as did both the increase in the obvious unselfishness of people, and the warmer spirit of neighbourliness which was experienced especially in the bombed areas. The stern necessities of the time imposed a stronger moral discipline, and it is my opinion that this brought with it an improvement in mental and perhaps also physical health.

An obvious example of the value of moral discipline is in the realm of sex, where control is particularly difficult because of the deep roots of the instinct, and because of the repressions which have followed inevitably from the development of our culture. No-one of experience will deny that the sex aspects of life affect health in many ways, and equally those experienced in dealing with these problems will agree that the appeal to expediency is inadequate to determine healthy sex behaviour.

The rôle of moral discipline cannot be neglected; whether it is religious or strictly ethical is a matter for the individual about which one has no right to be dogmatic. It is, however, perfectly legitimate to insist not only that it is important but also that it is essential.

METHODS OF PRESENTATION

Despite an extensive search I have been unable to find any study which takes a comprehensive view of the methods of health education. The nearest is a book by Williams and Shaw entitled *Methods and Materials of Health Education* (New York, 1937), but it does not go into the detail which seems desirable. We need an evaluation of the relative effectiveness of the different methods of propaganda, from lectures to health weeks, particularly in respect of their impact on different age-groups or social groups and their applicability to the type of message which has to be given. A study of this nature is urgently needed. Techniques exist for carrying out such an investigation and have been developed widely in America in the field of merchandising research. Some information of this kind has been collected in relation to the Ministry of Health's successful campaign for diphtheria immunisation, but we need more general research.

A system of classification should be the first step in planning a campaign of health education, whether it be extensive or intensive. Different systems of classification may be used; for example, we may divide the problem into one of school and adult education. The former falls into three subdivisions of infant, elementary, and secondary, and university and technical college groups. The adult education would subdivide into general, comprising city- or nation-wide campaigns, and special, covering the instruction of small groups such as St. John ambulance detachments, Women's Institutes, or patients attending a maternity and child-welfare centre. A second type of classification, parallel with the first, categorises the methods of instruction: oral (lectures, discussions, radio), visual (posters, advertisements, pamphlets, cinema, and exhibitions), and a comprehensive class of "health weeks." One might include in this list the provision of amenities, such as swimming-baths, gymnasia, and sports grounds; but the implications of this are wider than the strict field of health education. A third system of classification, which would be useful in devising a scheme for health education, would be to enumerate the people and organisations involved in conveying the message—doctors, teachers, sanitarians, societies, and associations of various kinds.[1]

In the absence of an analysis of actual observations an opinion carries little authority; but, if only to invite contradiction, I say that the oral approach is more effective in adult education than is the visual; radio and lectures appear more effective instruments than do advertisements or posters. The success of Sir Wilson Jameson and of Dr. Charles Hill on the air has been outstanding. The position of the cinema, however, is anomalous, because it combines both types of instruction, yet in this medium the visual element predominates over the spoken. There are great potentialities in the development of health-propaganda films, but the standard of technical achievement in this field has not advanced so quickly as it might well have done. Admittedly the techniques are in the difficult stage of formulation, but with two exceptions the standard of health films I have seen is poor. The main reason appears to be that they have been made for non-commercial purposes under the direction of a committee of some society or association.

If the health film is to have an effective future, its structure must be regarded far more as a matter for professionals than has been the case in the past.

1. See Kennedy, W. P. *Hlth Educ. J.* 1945, **3**, 60.

THREE LINES OF ACTION

There are three practical lines of action which are essential for making the most of health education.

The first is the provision, especially in the small centres of population, of more swimming-baths, gymnasia, and sports facilities. These are the workshops of health. In a recent visit to Germany I was impressed again by the way in which small towns were supplied with these amenities. Some hymn-writer once complained that it was not right that the devil should have all the best tunes. Equally we should not allow our fascist enemies to be able to claim that in such ways they did more for the people's health than does the stronghold of democracy.

The second point is the necessity for training more teachers in biological science and methods. Hygiene is an obligatory course in American schools, and many feel that this country lags deplorably in neglecting this study. But, unless fully trained teachers with a biological outlook are available, it is futile to introduce the subject. More harm than good would result if the ordinary teachers were given a *Reader in Hygiene* to go through with their classes. Prof. Lancelot Hogben has more than once put forward the demand that the universities' biological departments should review their instruction and train more students in general biology. The aim would be dual—to provide more biology teachers for schools, and to give all university students some knowledge of the science of life as an integral and essential part of cultural education. The educationist who would disagree with this proposal would be indeed a bold man.

Finally, there is no doubt in my mind that the churches should be coördinated more closely with the aims of national health. It has been shown that, from the holistic point of view, one must consider the moral aspect of human life with the physical and mental, and the point needs no amplification. It need only be added that the community group of the church congregation provides an admirable nucleus for concerted action. People of like conviction associate together easily, and the connexion with the church is advantageous in many ways. Within the church and outside it many voices are growing increasingly insistent that the church should pay a more vital contribution to the nation's life. Participation in health education is not merely another way in which this could be done. I submit that it is an essential duty for the churches to interest themselves in this matter, for life and health are a single whole, and no health education can be complete unless it includes in its ambit the physical, mental, and the moral activities of man.

Obituary

KARL NARBESHUBER

M.D.

Obermedizinalrat Karl Narbeshuber, who has died at Gmunden, Austria, in his 79th year, was a former president of the Austrian Medical Association. A true Austrian and a friend of the British, he was no doubt a marked man in the eyes of the Nazis, and no sooner did the Anschluss come than they took their revenge, treating him with cruelty and indignity. Hauled out of his bed on the first night he was thrown into prison, his life was threatened, his head and beard shaved, and he was deprived of his civil rights, property, and practice, and separated from his family. When Austria was freed he returned to his native town of Gmunden and once more devoted himself to his duties as Stadtarzt. But age and the privations of war had affected his health and he died on August 28.

A lovable man of wide learning and an exceptional linguist Dr. Narbeshuber did much for the British prisoners during the first world war. He often visited London, and many English doctors have enjoyed his agreeable hospitality in Austria.

J. A. H. B.

Special Articles

BRITISH-SWISS MEDICAL CONFERENCE

THE conference organised by the Swiss Academy of Medical Sciences and the Royal Society of Medicine opened in the hall of the ethnological museum of the University of Basle on Sept. 16. Of the 280 doctors present more than 150 had come from the United Kingdom. Prof. A. GIGON, secretary-general of the academy, who first proposed a conference of this kind, introduced Prof. KARL WEGELIN, the academy's president, who said that the aim, as at last year's Franco-Swiss conference in Geneva, was to foster international relations. Welcoming the British visitors he recalled the ancient political and cultural bonds between the two countries which had remained unbroken since the seventh century. For Switzerland he expressed satisfaction at the end of the intellectual isolation enforced by the war. Bundesrat ETTER, on behalf of the Swiss Federal Council, paid a tribute to British tenacity in the war and recalled what had been done since then to strengthen the links between his country and Britain. He mentioned in particular Switzerland's help in the difficult post-war period—for example, she had invited 400 British children to stay in the country. Other speakers at the opening meeting were Mr. T. M. SNOW, the British minister in Berne, Monsieur PAUL RUEGGER, the Swiss minister in London, Prof. EDGAR BONJOUR, rector of Basle University, Regierungsrat Dr. MIVILLE, representing the authorities of Basle, and Lord AMULREE, representing the Minister of Health, who recalled the world's debt to Switzerland for the International Red Cross and for her fine conception of political liberty. Prof. J. B. HUNTER, Prof. J. H. DIBLE, and Dr. ALAN DRURY, F.R.S., of the British organising committee, emphasised the need for collaboration between the two countries and expressed thanks for Swiss hospitality.

After the formal opening Sir HUGH CAIRNS read a paper in German on Investigations on Head Injuries in Britain during the Second World War. Other papers were given in English with a simultaneous translation into German.

The afternoon session, under the chairmanship of Sir LEONARD PARSONS, was opened by Prof. LUZIUS RUEDI, who spoke on Acoustic Trauma, of which he distinguished four types which could be classified according to loss of function into two groups: the first group comprised noise trauma, report trauma, and certain blunt head injuries, and the second explosive trauma. He went on to describe an ear defender which he had designed, containing a resonator; its effect was to damp down frequencies between 2000 and 7000 cycles per second without seriously interfering with hearing. Repeated experiments had proved the complete efficiency of this defender which he suggested could be usefully applied in industry.

CIRCULATORY FAILURE

Dr. JOHN MCMICHAEL (London) said that the old "back-pressure" view of cardiac failure was based on the mistaken idea that the veins are inert tubes. Thirty years ago Starling showed, by means of his heart-lung preparation in the dog, that the most important single factor determining cardiac output is the venous inflow; up to a certain point elongation of the cardiac muscle increases its capacity for work, but beyond that point output falls. Harrison, in 1935, suggested that the output of the heart might not be very much lowered in heart failure, and in 1938 Dr. McMichael reached much the same conclusion. In the early stages of failure the resting output may not be significantly lowered, but the capacity to increase output is diminished. Only later does the output fall, and then usually to not less than half the normal resting value. The measurement of right auricular pressure by a ureteric catheter, first practised by Cournand in New York, has proved a safe and effective means of estimating cardiac output and filling pressure, and has been employed without mishap in over 500 cases by Dr. McMichael and his colleagues. The new method has confirmed that in the ordinary forms of heart disease, from valvular defects or hypertension, the resting output is maintained and the first rise of venous pressure takes place when the output is only slightly below the normal average. This rise is thus not the back-pressure effect of a falling output but a compensatory mechanism to maintain the optimum output as long as possible. In the later stages of failure the venous pressure is considerably raised and the cardiac output reduced to about 3 litres a minute. In the failing heart digitalis reduces the venous pressure and increases the cardiac output, though in the normal heart the reduction of venous pressure is accompanied by a fall in output. In auricular fibrillation rate-reduction is not of primary therapeutic importance; the major benefits of digitalis are achieved by reducing the venous pressure, and a mechanical reduction of venous pressure will produce as great an improvement as digitalis.

Discussing the conditions in which a high cardiac output is required to oxygenate the tissues, Dr. McMichael said that Sharpey-Schafer has shown that when the hæmoglobin falls below 30% the cardiac output may need to be doubled and this can be accomplished only by a high venous pressure and a simultaneous increase of pulse-rate. At this stage the patient's condition is precarious, and venous congestion and œdema may be pronounced. Digitalis will lower venous pressure and cardiac output, so reducing the supply of oxygen to the tissues and making the patient worse; transfusion, on the other hand, will raise the right auricular pressure but reduce the cardiac output, and this may result in death from heart failure, owing to pulmonary œdema. If transfusion is necessary to save such a patient's life it must be given slowly, possibly combined with digitalis. The danger lies in raising the venous pressure, which is set at the optimal level, so the anæmic patient should be treated with liver or iron, as far as possible avoiding transfusion. In cor pulmonale the output is usually high for a reason similar to that in anæmia—i.e., the available oxygen in the arterial blood is considerably reduced. Here digitalis is not only useless but dangerous. High-output failure has recently been observed with generalised Paget's disease, in a man of 66. The blood-flow through the normal skeleton, measured by Prof. O. G. Edholm with the plethysmograph, is about 100 c.cm. a minute, whereas in Paget's disease the total skeletal flow is between 3 and 4 litres a minute. The circulatory state is thus a result of the enormous increase in skeletal circulation.

The classical pre-war conception of shock has been modified; the view that blood is pooled or trapped in some part of the vascular system has been discarded. Hæmorrhage is the major factor in war wounds; hæmoconcentration does not occur except in burns and crush injuries and some types of abdominal injury. Wallace and Sharpey-Schafer have shown that, after the loss of 1000–1200 c.cm. of blood, full blood-dilution is not attained for some 40 hours. Blood-volume may be reduced in chronic anæmia, and this state is associated with an increased cardiac output. In hæmorrhage the pressure falls in the great veins, the cardiac output falls, the pulse-rate is accelerated, and the peripheral resistance is increased. After this first phase there may be a vasovagal reaction, owing to sudden vasodilatation in the arterioles of the skeletal musculature, with reduction in pulse-rate and blood-pressure. Recovery from this reaction, whose purpose is obscure, may be hastened by 'Methedrine.' D. W. Richards has shown that in the average case of shock the cardiac output seldom falls below 3 litres a minute; the deep fall in blood-pressure is due mostly to lack of vasoconstriction, for which hitherto ill-defined factors in addition to the vasovagal reaction may be responsible. Oxygen is worthless as a means of overcoming the defects of sluggish blood-flow in shock. Recent observations suggest that in shock with overwhelming infections the regulation of venomotor tone may be impaired and a suprarenal cortical mechanism may be involved somewhere in the chain of events. Other types of non-surgical shock—e.g., the collapse of diabetic coma and coronary thrombosis—should be approached by the new methods.

Observation suggests that peripheral vasodilatation and a high cardiac output are present in the early stages of diabetic acidosis.

ŒSTROGENS IN CANCER

Prof. E. C. DODDS (London) recalled the steps which led to the synthesis of stilbœstrol, hexœstrol, and dienœstrol as the result of collaboration between Sir Robert Robinson and his colleagues in Oxford and Professor Dodds's own department at the Middlesex Hospital. Animal experiments have shown that these three substances can replace all the known activities of the naturally occurring œstrogens. They have now been widely used clinically for the treatment of menopausal symptoms, amenorrhœa, and dysmenorrhœa, and for the termination of lactation. Their great advantage lies in the fact that they are active by mouth and cheap to produce. The possibility of using œstrogens in the treatment of carcinoma of the prostate was first mooted by Huggins and his colleagues in 1941. Castration for the relief of prostatic carcinoma was originally advocated by John Hunter, who observed that the gland would shrink when the testes were removed. However, the operation had so many objections from the patient's point of view that it was rarely performed. In the four years from 1939 to 1943 Huggins treated 69 patients with advanced carcinoma of the prostate by castration combined with the administration of œstrogens. The synthetic œstrogens were found to be perfectly suitable for this purpose. Œstrogens were administered to patients who did not obtain a long remission of their symptoms after castration and to those in which the serum-level of acid phosphatase, though considerably reduced, did not drop to normal. In most cases the treatment relieved pain and frequency of micturition, and improved the patient's general condition; in some cases there was a reduction in size of the primary tumour and the secondary deposits. Other workers in Britain and America have treated carcinoma of the prostate with œstrogens alone and have confirmed Huggins's findings. About 95% of cases respond in some degree, but the improvement is not always maintained and many cases will have to be classed eventually as delayed failures. No serious worker in this field would claim that synthetic œstrogens will cure carcinoma of the prostate, since if treatment is interrupted the disease begins to progress again as before. But the treatment is more than mere palliation; the benefit obtained, even if only temporary, constitutes a definite arrest if not a regression of the disease. Side-effects reported from the administration of œstrogens include swelling, tenderness, or soreness of the breasts, nausea, vomiting, and occasionally soreness of the testes. As a rule these effects are not serious enough to require cessation of therapy and they are generally far outweighed by the benefits obtained. The dosage of synthetic œstrogens is 1 to 5 mg. per day.

The exact mode of action of œstrogens in carcinoma of the prostate has still to be worked out. The changes in the serum-level of acid phosphatase indicate that the metabolism of the malignant cells is interfered with. This enzyme is present in large quantities as a secondary sexual characteristic in the adult prostate, and its presence depends on the activity of androgens. The serum-level of acid phosphatase was shown in 1936 to be abnormally increased in some men with metastatic carcinoma of the prostate, and in 1941, Huggins demonstrated that the level can be reduced either by orchidectomy or by the administration of œstrogens. He also pointed out that in many cases a malignant prostatic tumour is due to hypertrophy of adult epithelial cells which are acted on by androgens. He therefore deduced that if the activity of androgens could be inhibited, either by removal of the testes or by the administration of œstrogens, then the growth of these cells would be interfered with and the tumour and possibly the secondaries would regress. A possible explanation for the occasional failure of œstrogen therapy is that these tumours may be due to the malignant development of other cells over which androgens have no control. A further explanation is the existence of an extragonadal source of androgens, possibly in the adrenal cortex. It is still doubtful whether, in addition to the inhibition of androgens, the synthetic œstrogens exert some definite controlling influence on the malignant cells themselves. Biopsies on cases before and after treatment with stilbœstrol have revealed characteristic changes in the cells, different from those caused by irradiation.

Until the action of synthetic œstrogens in prostatic carcinoma is explained it is impossible to forecast the likelihood of success in carcinomas of other parts. Some success has been obtained in carcinoma of the breast—of 168 cases reported by various workers, 41 were improved, and in 6 the improvement was "spectacular"—and again the question arises whether the improvement is due to a change in the endocrine balance or to the specific action of the drug on a certain type of cell. A committee has been set up by the Royal Society of Medicine and the British Empire Cancer Campaign to investigate a large number of cases of carcinoma treated with synthetic œstrogens and to follow them up over a long period. The report of this committee cannot appear for some years, but it is hoped that it will yield valuable information on the type of case most likely to be benefited and the reasons why such benefit is to be expected.

A VISIT TO FINLAND

W. P. GURASSA M.B. Lond. F. L. JACKSON M.B. Lond.

WHILE on a visit to Stockholm, in March of this year, we were assisted by the British Council to visit Helsinki, so that we could see something of the medical work there and meet some of the students and young physicians.

The journey across the Baltic was an entirely new experience. The sea was frozen almost all the way over, so that even with the assistance of icebreakers progress was slow. Several times the ship jammed in the ice and we arrived at Abo many hours late. But the weather was wonderful—cold and crisp with brilliant sunshine. This, with the spectacle of myriads of tiny islands, made the journey a delight.

The train journey to Helsinki from Abo was not so pleasant. We left Abo early in the morning, without any breakfast. Finnish restaurant food is bad. We were offered some tiny scraps of rye bread with a little fish roe on them, but could not face them, so we sustained ourselves with some sugar which we had brought from Sweden. Later, when the train stopped for a quarter of an hour at a station we ate some potato, which in our then famished state seemed extremely good.

At Helsinki we were met by the assistant professor of radiology from the General Hospital and two students, one of whom was a Swede who spoke fluent English and acted as our guide during our short stay. We were taken immediately to see Professor Holsti, the professor of internal medicine, who entertained us generously, both at the hospital and at his home. He spoke excellent English, having studied for some years in America, and in true American fashion had prepared for us a very full programme designed to show us as much as possible.

At 8.30 on the first morning we attended the radiology department, where we saw some films showing opacities in the lungs of patients with typhus, early in the attack before the appearance of the rash; these opacities are fleeting, and should be sought specifically. Another interesting film of the chest showed the characteristic ground-glass appearance of asbestosis. We were impressed by the quality of the work and the enthusiasm of the staff.

Next we were conducted round the Polyclinic by Professor Holsti. We saw several cases of Buerger's disease, one in a patient of 17 years, and were told that it is common in Finland. Another condition of which we heard much was dibothriocephalus infestation, and we were each presented with specimens of the worms to bring back to England. This, however, was probably unnecessary, since after eating some of the

fish obtainable in Finland—raw—we probably now harbour sufficient of the parasites ourselves! The morning concluded with visits to special departments for the treatment of cancer, chiefly by radiotherapy, and the newly formed allergy clinic under the direction of Dr. Erikson-Lihr, the first of its kind in Finland.

A national scourge in Finland is tuberculosis, the annual mortality-rate being 17 per 10,000. Dr. Severi Savonen, who is in charge of the tuberculosis services in Finland, told us that the war had brought a halt to the previous decline in the mortality-rate. As elsewhere in Scandinavia, B.C.G. inoculation is widely used, on a voluntary basis. Infants are inoculated, where possible, in the obstetric clinics soon after birth, and special homes are provided for the isolation of infants from open cases. Savonen believes that inoculation produces excellent results and does not give rise to ill effects. At Christmas time, money for anti-tuberculosis work is raised by the sale of coloured stamps which are stuck on the letters in addition to postage stamps.

Later, Professor Holsti initiated us into the mysteries of the Finnish steam bath (sauna), which is widely acclaimed as responsible for the toughness of the Finns, endowing them with a spirit of unbounded energy and stubborn determination (sisu). Many people have their own steam baths, and Professor Holsti's was in a rough wooden shack in his garden. In the corner burned a fire, and water drawn from a near-by trough was cast on to it so that clouds of steam billowed into the room. It is the custom to lie outstretched on wooden shelves and perspire freely. From time to time one washes with cold water, or beats oneself with a sheaf of leafy twigs which have been dipped in cold water. Then the heat increases. When one feels sufficiently relaxed one runs outside and rolls in the cold snow for a minute or two. This closes the skin vessels and facilitates drying. We dried without this severe preliminary act, but watched amazed while the professor's son and our Swedish guide performed it.

Next morning we visited the neuropsychiatric institute at Lappvik, where we were conducted round the wards by Dr. von Bagh who addressed us in French. This institute is over 100 years old, but its construction is good. The wards and corridors are light and airy, and, as in most Scandinavian clinics, there are few patients in each room (3–6). We saw many cases of disseminated sclerosis, and it was claimed that fairly good temporary results were obtained by pyretotherapy. Prefrontal leucotomy has recently been introduced in Finland, being used particularly for the treatment of chronic obsessional states. We saw the first case so treated at this hospital.

We learnt something of the poor food situation both from personal experience and from accounts given to us by medical men. Bread is of the poorest quality, dark, coarse, and bitter, and is strictly rationed. Milk is rationed to 600 c.cm. per person per week, butter to 500 grammes a month, and no other fat is obtainable. Meat is rarely seen. The staple diet consists of potato, bread, and fish. There is, however, a large black market in food for those who can afford it. Most of the people look thin and ill clad, and Helsinki, once proudly called the "White City of the North," shows signs of neglect and dilapidation.

On our last evening we were entertained to dinner by the Medical Association. We gave them some account of our medical studies in England, and many of them expressed a desire to visit England later on. We have brought back many pleasant memories of Finnish hospitality.

The Finns look with confidence and determination to the future—their "sisu" is no myth—and they will strive hard to restore prosperity to their land.

ARMY REFRESHER COURSES IN GERMANY

AT the end of the late war the university clinic at Göttingen, with its 2000 beds, was found to contain a remarkable selection of clinical material. In the ensuing months Major J. M. McFie and Major H. C. McLaren, the medical and surgical specialists attached to a nearby casualty clearing station, paid repeated visits to the clinic, with which they were so impressed that they suggested that refresher courses should be held there for medical officers, particularly those on general duty; such courses, they thought, might encourage post-graduate study. The proposal was warmly supported by the director of medical services, and the consulting physician and surgeon, 21 Army Group; and the first course was held from Nov. 18 to 24, under the direction of Major McLaren, who was later succeeded by Captain P. E. H. Jones.

CLINICAL TEACHING

The clinical teaching was given by the university staff. Few of these spoke fluent English and most officers had difficulty in following explanations in German; direct interpretation was tedious and sometimes misleading. A German-speaking specialist officer, R.A.M.C., was therefore appointed chairman-interpreter. Case-notes were abstracted and translated into English, and the translation was circulated with the original notes in German, which, with even slight knowledge of the language, provided a good deal of information.

Cases were chosen with straightforward clinical signs to illustrate common disorders. In the medical and surgical clinics each officer was allotted a long case, with twenty minutes for examination, followed by five minutes in which he summarised his findings before the whole class, and a further five minutes for the professor's comments. Short cases were also shown. Midwifery and gynæcology were handled on much the same lines. Post-mortem demonstrations were included; and for a short time each day the Germans demonstrated their own recent advances. The morning break and a further period at the end of the day were used for discussion; time at the clinic was often saved by deferment of individual questions until these meetings.

The German method of teaching differs from the British. With the British method interest is sustained by the discussion of history, symptoms and signs, and differential diagnosis, and by the liability of anyone suddenly to be asked a question. By the German method the diagnosis is often given first and followed by a discourse in which the grounds for the diagnosis are discussed. Much the same results are achieved in the end by the two techniques. For the courses the British method was used.

OPEN LECTURES

The last afternoon was usually occupied with a lecture or demonstration by either the consulting physician or surgeon, or a medical officer with special knowledge of some subject. These were open lectures which might be attended by anyone, including sometimes nurses from the clinic; as many as 150 have been present. The arrangement that has proved most satisfactory has been for the lecturer to speak slowly and clearly in English, and for each listener to have a German translation in front of him. Experience has shown that translation of German case-notes into English is best undertaken by an Englishman, but that the German version of a lecture to be given in English should be made by a German.

Medical officers attending the clinic have had the chance of seeing German methods and of obtaining clinical instruction in aspects of medicine which during their service they had had little opportunity of studying. The reading of textbooks, which has been increasingly practised since the end of the war, has been given added impetus by these courses, which have been greatly appreciated; and the German staff has worked hard to make them successful. Seven courses have been held at Göttingen, and they are being continued at Hamburg, which is more readily accessible. In addition, courses in midwifery are being held for nursing officers. It is intended that these courses shall be retained as a permanent feature of training in the B.A.O.R.

In England Now

A Running Commentary by Peripatetic Correspondents

DURING the war one had either to "stay put" or to keep moving round the world at an enormous pace. After nearly four years of the former, I spent the later part of the war in almost incessant travel. I gather that we itinerants were generally spoken of as "swans"—i.e., creatures who flit aimlessly from place to place sticking their long necks out. One's journeys ("really necessary" or otherwise) were often brightened by unexpected meetings with old friends. For instance, when I arrived at a general hospital in North Africa the first officer I met greeted me by my christian name—much to my surprise, for I certainly did not recognise the prosperous, mature individual who spoke. I discovered that we had been new boys at the same prep. school together, and that he had changed inwardly a good deal less than in outward appearance. And the O.C. of the same hospital turned out to be our own family physician, a territorial with whom I had lost touch since his call-up in 1939.

Then there are the people one is always meeting. One eminent medical major-general has done even more "swanning" than I have. Within a period of eighteen months our orbits have touched, quite without premeditation, at Prestwick airport (he en route for the U.S.A.; I on my way home from Africa), London, Manchester, Colombo, Melbourne, Delhi, and finally back in London again. I am convinced that if I ever reach the North Pole I shall find him squatting there. Then there are the others that one just misses. I have been trying to meet one scientist for years, and have been within a week of him in every continent of the globe.

It is often impossible to avoid the use of such clichés as "it's a small world." I remember meeting one American major at a laboratory in the heart of the Rockies. A month later we met again, this time at Myitkyina, on the Irrawaddy, in Burma, after he had crossed the Atlantic and I had crossed the Pacific.

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Yes, as I was saying when you cut me off on Sept. 7, the practitioner in the Medically Overcrowded Area (M.O.A.) is perhaps less like a vulture than like that aged man a-sitting on a gate, of whom the poet sang:

> I shook him well from side to side
> Until his face was blue.
> "Come, tell me how you live," I cried,
> "And what it is you do."

True, neither a Royal Commission nor anyone else has, in so many words, asked him; but there can be no doubt of the shaking. It continues with increasing violence and perhaps can be taken to imply the question. Anyhow by the time the cyanosis has reached ante-mortem intensity it will be hard to give an articulate and dispassionate reply. That hour is not far distant. Better try now.

The essential feature of a M.O.A.—at least of mine—is that although it contains a fairly intimate mixture of citizens of every social and economic class a good number are what is called "educated"; some have comfortable incomes and some have inherited that sane and comely fashion of living which made Maurois call the English gentleman "la type la plus sympathique du monde." The combination of all this with the famous medical overcrowding has an almost wholly beneficent effect on the quality of medical practice. Comparatively speaking there is time for good work, rewards for doing it, and effective penalties for not doing it. Our all-round competence is, I am sure, less than that of many of our colleagues in country towns, to whom I take my hat right off; we are not their equals in resourcefulness, nor, I suspect, in power of endurance; they would beat us hands down at surgery, and I judge that they are better at team-work—your typical M.O.A. doctor works alone—but there are provinces of medicine in which I believe we hold the field.

It is fashionable to assert that the whole profession takes little or no interest in personal preventive medicine; it never sees the healthy patient and seldom even the early symptom; its concern is solely with declared disease. How different things will be when we have health centres! Perhaps they will, but in the meantime all these things which the whole profession neglects to do it does in fact daily, hourly, and as a matter of course in the M.O.A.

To set aside half or three-quarters of an hour for discussion of Susan's aversion to food and Willie's to sleep, for the terminal or annual overhaul of three children returning to school; to determine whether or why Mr. Smith has grown thinner, or why Miss Jones has been coughing for four weeks; to give Mr. Brown the once-over because he hasn't seen a doctor for several years—all the variations on these and kindred themes make up, except in seasons of epidemic, a large proportion of our daily work.

Now I am far from asserting that this is indeed the medicine of the future. For the practitioner it is exacting, difficult, rather tedious, full of pitfalls, and not very rewarding either in cash or in things discovered or things prevented. It can never be a main fountain of health, and for the patient it has potentialities for ill as for good. But it is the medical reformer's white-headed boy, it is perhaps the chief characteristic product of the M.O.A., and when the reformer has had his way with us the M.O.A. and all its works will be gone. Forsooth, a pretty paradox! But each man kills the thing he loves; and perhaps reformers are no exception.

What else do we do? The doctor's daily job, with perhaps six hours over in the week to divide between reading, writing, committees and societies, the family, and the cultivation of a garden or an art. Six? Well, perhaps eight, and, being on good terms with our professional neighbours, we get a yearly holiday without importing a locum. What really attracts us to the spot? Not fortune-hunting, but, this excluded, it is anyone's guess. My own is that if we were examined the greatest common factor in our make-up would be a certain slowness—we are not quick thinkers or quick workers; we must have time. Unquestionably we are individualists, with the qualities and defects of that species. Probably most of us set rather a high value on the pleasant manners and way of life to which most of us have been brought up and prefer a small income in a place where our wives and children can enjoy these things to a large one where they cannot. We may believe, too, that we can do our best work where we are; and we may be right.

What of our patients—the citizens of the M.O.A.? Are they privileged? I think they are; but not, as the planners preach and possibly believe, by receiving some costly drugs or magic treatments denied to others. They have, and exercise, free choice of the most genuine sort; they reap the very real benefits of competition. Each of us knows that if he lets his patient down that patient can turn to his neighbour. It is very salutary knowledge. They enjoy the almost priceless boon of being able to ask for an appointment to discuss any matter in which they think we can help them. To extend this last benefit to "insured persons" without much more encouragement than any government of the last 35 years has given must seem to most people impracticable. It seems so to me; but most men do not readily divide themselves, no-one can stop the diffusion of excellence, and there can be no doubt that all the citizens of the M.O.A. have some share in the refreshing fruits of medical overcrowding.

Nor, I think, can diffusion stop there. So long as there is somewhere a standard of excellence, there will be a tendency everywhere to attain it; destroy the standard and the tendency must cease.

Perhaps our manner of practice in the M.O.A. has no excellence, but if it has look your last on it, for it is scheduled for demolition. The shaking or "softening-up" by gently persistent public detraction and by alternate promises of sweets and smacks is well advanced. On the Appointed Day all our patients, I suppose, become "panel patients" and we can take our choice. We can try to maintain our standards under the familiar conditions of government contract practice with this egregious addition, that whereas it must clearly be both illegal and wrong to take fees from our own patients it will be legal and, in the eyes of authority, positively meritorious to see other men's patients behind their backs, give them an "independent opinion," and lift a fee for it. The whole foundation, in fact, economic and ethical, of our manner of practice will on that day be *bouleversé*.

But we have a choice. We can reject the sweets, accept the smacks, and take, bow in hand, to the merry green wood, outlawed for sabotage. A grim choice.

But think of the M.U.A.—the Medically Undercrowded Area. So I will; and I will think of their houses. I am shocked at the inequality of housing. Some live in mansions, some in hovels; but I have a plan. On an appointed day all who live in houses better or worse than an approved middle shall be housed in prefabs. Then, all their dwellings being alike demolished, the specially good brick, stone, timber, and tiles of the mansions can be used to fortify and increase the stock from which the approved middling houses in which all shall hereafter live are to be built. When all are in them, there being none better all will have the best.

What? You do not like my plan? You cannot bear that a house architecturally good and beautiful should be destroyed? You think it is part of our common inheritance, that it has value as a pattern? You don't think the bricks and stone of the mansions will go very far? You think they will be scarcely detectable? Sentimental dreamer! Hide-bound Tory! Enemy of the People! Upholder of privilege! Fascist reactionary! *Bourgeois!*

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As I was doing a locum near, I went on pilgrimage to Selborne. I met the vicar, who told me a story of Gilbert White (see portrait), who was a small and precise man. When he was a subproctor at Oxford he found an undergraduate lying drunk and naked in the street and next morning he lectured him but did not punish him because even in his cups he had folded his clothes neatly by his side.

I touched the limes White planted to hide the carnage of the butcher's shop, I trod reverently on his grandfather's grave in the chancel of the village church, I admired the window—except its garish top—put up to his memory, mosaiced with many birds, and then went out to his own grave in the churchyard. It was pleasantly untended, hawkbit flowered on it and there were two thriving colonies of red ants. He would have liked that. I let them sting me, striving at a molecular continuity and kinship. May the peace that comes from the things of the earth, which he got and gave—and gives—be with him still.

* * *

I wonder how many people are making full use of the results of war-time research to increase their comfort when on holiday in Britain. Our biting insects and mites may not be the vectors of disease (and anyhow this year's weather has not encouraged cold-blooded creatures to breed) but many a holiday has been ruined by midges, gnats, or harvest-mites. D.M.P., or dimethyl phthalate, was well known to the troops in south-east Asia and elsewhere as an insect repellent, but how many have thought of it at home? And many who have had to go through the whole drill of smearing their clothes with D.B.P. in scrub-typhus areas have never thought of doing anything like that when they are attacked by harvest-mites. Yet one can protect oneself pretty thoroughly from these creatures by smearing a couple of c.cm. (or should we say ml. ?) of either benzyl benzoate (any of the anti-scabies remedies containing it will do equally well), or of dibutyl phthalate on one's socks and perhaps round one's trouser bottoms. The remedy remains effective for several washes, so one application at the start of the harvest-mite season should do the trick.

HOSPITALS DAY.—This year hospitals day in London is to be Oct. 8. All who can help are asked to write at once to the appeal secretary of their local voluntary hospital, or to Lord Luke, chairman of Hospitals Day, 36, Kingsway, London, W.C.2.

Public Health

Typhoid at Aberystwyth

THERE are now further details of the outbreak of typhoid fever at Aberystwyth. Several people in the town were taken ill on July 22, 23, and 24, with headache, pyrexia, and cough; and on July 26 the first case of typhoid was identified. During the next few days the condition was diagnosed serologically in several further people whose history appeared to incriminate ice-cream sold by a particular vendor. A spot-chart kept at the Public-health Department indicated clearly that, apart from water, ice-cream sold by this man was the only foodstuff common to all patients admitted to hospital. The milk-supply in the town is zoned; and the fact that all the patients happened to belong to different zones was a great help in ruling out milk as the source of infection.

The county medical officer of health arranged for the isolation of all cases of typhoid, either in the local hospital or in hospitals in South Wales, and an ambulance service was organised. These arrangements worked smoothly.

The sale of ice-cream by the suspected vendor was stopped on July 29; his blood gave a positive Widal reaction to *Bact. typhosum* (H) at a dilution of 1 in 320, and to (O) at 1 in 80; it also reacted to Vi at 1 in 80. Specimens of fæces grew no enteric organisms, but *Bact. typhosum* was grown from the man's urine and was later found to be of type C. He was admitted to an isolation hospital for further investigation and treatment. By this time *Bact. typhosum* had been isolated from the other patients; they were all of type C.

Cases of typhoid have since been identified in the neighbouring district and elsewhere in the country in people who had lately been to Aberystwyth and partaken of ice-cream, many of them naming the particular seller. Altogether 76 cases have been notified in other areas.

The course of the outbreak is illustrated by the weekly notifications from Aberystwyth.

Week ending ..	July 27	Aug. 3	Aug. 10	Aug. 17	Aug. 24	Aug. 31	Sept. 7
Cases notified ..	1	43	29	18	10	1	3

So far only one case has been reported with an onset more than 23 days after the sale of ice-cream by the carrier was stopped. This patient was a contact with his wife who had been ill for some days before calling in a doctor. Up to Sept. 8 only one other contact appears to have contracted the infection.

The diagnosis of cases and the tracking of carriers has been much facilitated by the presence of an Emergency Public-Health Laboratory in the local hospital. The immense value of such a laboratory in remote areas has been clearly demonstrated.

Infectious Disease in England and Wales

WEEK ENDED SEPT. 7

Notifications.—Smallpox, 0; scarlet fever, 668; whooping-cough, 1824; diphtheria, 284; paratyphoid, 42; typhoid, 21; measles (excluding rubella), 1321; pneumonia (primary or influenzal), 292; cerebrospinal fever, 33; poliomyelitis, 19; polio-encephalitis, 5; encephalitis lethargica, 0; dysentery, 86; puerperal pyrexia, 136; ophthalmia neonatorum, 74. No case of cholera, plague, or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Sept. 4 was 813. During the previous week the following cases were admitted: scarlet fever, 42; diphtheria, 38; measles, 17; whooping-cough, 27.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 2 (0) from enteric fevers, 6 (0) from whooping-cough, 2 (0) from diphtheria, 31 (0) from diarrhœa and enteritis under two years, and 5 (2) from influenza. The figures in parentheses are those for London itself.

Bradford reported the 2 fatal cases of an enteric fever.

The number of stillbirths notified during the week was 236 (corresponding to a rate of 26 per thousand total births), including 34 in London.

Letters to the Editor

B.C.G.: THE NEXT PHASE

SIR,—Your timely leader of Sept. 14 raises a number of points of practical significance. As one who has recently visited the Scandinavian countries,[1] where I had a unique opportunity for seeing the work myself, I may perhaps make a few preliminary observations. I hope to publish my experiences more fully later.

I found the enthusiasm for B.C.G. in Norway, Sweden, and Denmark widespread, and most people were convinced of its efficacy as a valuable adjunct in the control of tuberculosis, although several public-health experts emphasised that vaccination should in no way interfere with established anti-tuberculosis measures. I was struck, too, with the little control work done on B.C.G. in any of the three countries, and, while I can understand and appreciate the difficulties encountered in this connexion, I hope that in this country we shall have an opportunity for remedying this defect in order to produce reliable statistical evidence of the value of immunisation. Such control work as I saw—admittedly the figures were comparatively small—was convincing; but I agree with your statement that "only the most carefully compiled figures in significant quantity will satisfy the statisticians."

Although we rightly look to chemotherapy for striking results in the future I think it is true that in this country a somewhat neglected field of preventive medicine has been protection against tuberculosis by active immunisation in tuberculin-negative subjects, more particularly among persons in areas of high tuberculosis morbidity and mortality—e.g., children of tuberculous families, students, nurses, and other young employees in general hospitals and sanatoria where exposure is great and protection difficult.

Taking into account the difference in the clinical features of tuberculosis in this country from those I noted in Scandinavia I felt that their work was highly encouraging. Few will question Heimbeck's original assertion—for which he deserves the highest credit—that tuberculin-negative nurses show a higher incidence of tuberculosis than those who are tuberculin-positive. I was privileged to see with him in Oslo a further extension of this work which more than corroborated his earlier observations.

Nothing that I saw impressed me more than the work of Prof. Arvid Wallgren, now professor of pædiatrics in Stockholm, who has certainly been the pioneer of B.C.G. vaccination in Sweden, having started his work in Gothenburg in 1926. His confidence in the clinical value of B.C.G. remains undaunted although he recognises its limitation and admits that it is not of use except in primary lung tuberculosis. Unfortunately even Wallgren has, however, had little opportunity for control work.

With regard to the respective merits of B.C.G. vaccine and the vole-bacillus vaccine of Wells, which you rightly suggest is running B.C.G. very close, Wallgren's observations to me are not without interest. He urged, from his own experience of vole vaccine, that it would be of the greatest scientific interest and value if we in this country were to use it. He gave me the impression that it would eventually supersede B.C.G. I think there is good evidence for the belief that both methods of inoculation (*a*) are harmless to humans, (*b*) increase resistance to tuberculosis, and (*c*) are of value only in tuberculin-negative subjects. B.C.G. has stood the test of time in many countries and its harmlessness has been established by its practical application on a large scale in many parts of the world. Nevertheless, there is good evidence that the vole-bacillus vaccine has the following advantages over B.C.G.: (*a*) it is apparently a more potent immunising agent; (*b*) its virulence is more stable (the varying virulence of B.C.G. in Norway, Denmark, and Sweden was noteworthy, and I was told on more than one occasion that some of the strains were losing their virulence); and (*c*) there is reason to believe that tuberculin allergy following vaccination with it was greater and occurred earlier than that following B.C.G.

Let me add a word about the method of administration of the vaccine. Wherever I went in the three countries the intracutaneous method devised by Wallgren was regarded as the quickest, most reliable, and practical; and it afforded a more accurate measure of the dosage. All observers were emphatic that complications such as significant abscesses never arose when the injection was truly an intradermal one but did arise when the technique was bad and some of the solution had been injected subcutaneously. I was given, especially in Denmark, an opportunity of assisting at the B.C.G. vaccine clinic and I can corroborate this view from what I saw. Such authorities as Herzberg in Oslo, Wallgren in Stockholm, Anderson in Gothenburg, and Winge in Copenhagen strongly favoured this method. The so-called transcutaneous method, either by scarification or multiple puncture with the Birkhaug-Rosenthal instrument, seemed to meet with little favour for a variety of reasons which space will not permit me to deal with here, and I had an excellent demonstration of it by a great authority.

From these impressions I think one is justified in urging that enthusiasm should be tempered with caution. Wisely handled there is little doubt that immunisation should prove a useful weapon. We have a unique opportunity for starting afresh with adequate control experiments and filling in the gaps which Continental and other workers, often through lack of opportunities and no fault of their own, have omitted. We must furnish sound statistical proof, beginning for preference with a selected group of the population who are exposed to unusual risks of tuberculous infection. May I, therefore, strongly support your plea that the Ministry of Health set up, as soon as practicable, an authoritative committee under the auspices of a body such as the Medical Research Council to institute a clinical trial of what they regard as the most effective method of tuberculosis vaccination?

London, W.1. PHILIP ELLMAN.

1. My visit was sponsored by the public-health committee of the county borough of East Ham, for whom I act as consulting physician for tuberculosis and diseases of the chest, and to whom I am greatly indebted.

TREATMENT OF MENINGITIS

SIR,—Dr. Gaisford's letter of August 17 should serve as a useful corrective to over-enthusiasm. Whenever a new remedy is discovered for any particular malady, there seems to be a regrettable tendency to discard the older and often well-tried remedies. Recent examples of this appear to be syphilis and perhaps meningitis, particularly cerebrospinal fever. In the latter, it is surely a retrograde step to employ intrathecal therapy unnecessarily. What then are the indications?

Possibly the greatest triumph of the sulphonamides has been in the treatment of cerebrospinal fever, including acute and chronic meningococcal septicæmia, and the great majority of cases—95% according to Dr. Banks (Sept. 7)—respond excellently. With the exception of cases of sulphonamide intolerance and those rare cases of the ordinary types of the disease which fail to respond to sulphonamides, there is no real indication for the use of penicillin, at any rate intrathecally, in the non-fulminating varieties of cerebrospinal fever.

The fulminating varieties can be divided, perhaps a little arbitrarily, into those cases which are often dead within a few hours—Waterhouse-Friderichsen syndrome—and the type with well-marked meningitis which progresses to a fatal termination in about twenty-four hours. I have no experience of the use of penicillin in the former type of case, but its efficacy by whatever route it is administered (and it should certainly be given) would seem doubtful. In the second type of fulminating case, if after a few hours on combined sulphonamide and systemic penicillin therapy the patient's condition is still rapidly deteriorating, then, in accordance with the evidence so far available, intrathecal penicillin is indicated. I have not had cause to regret this, and two such injections are usually sufficient. It is important to remember, however, that such cases comprise a very small percentage of the total.

Similarly, penicillin is indicated in pneumococcal, streptococcal, and staphylococcal meningitis; and, in those cases which do not soon show improvement on systemic administration of the drug, the intrathecal route is again indicated. I have successfully employed

this method in pneumococcal meningitis when, despite previous sulphonamide medication, the general condition continued to deteriorate. Obviously, as few intrathecal injections as possible should be given and one hopes that heroic procedures such as trephining the skull for the intraventricular injection of penicillin will not be embarked on indiscriminately.

It seems then that the indications for intrathecal penicillin are strictly limited and uncommon, and that the mere fact of the cerebrospinal fluid being opalescent or turbid or the cell-count increased are no indications for such therapy. The immediate risks are obvious—for example, the introduction of penicillin-resistant organisms—and the possibility of delayed sequelæ, such as postmeningitic headache, should not be forgotten. Clearly, much judgment and skill are required in deciding when this route of administration is advisable.

Royal Naval Auxiliary Hospital, Barrow Gurney, Bristol. J. L. FLUKER.

EFFECT OF PHOSPHATE ON CARBOHYDRATE ABSORPTION IN SPRUE

SIR,—Many will learn with regret, on reading his letter of Sept. 14, that Professor Maegraith has had to abandon his experimental work on sprue. I take this opportunity of making one comment. In both his letter and the preliminary communication referred to [1] he gives the impression that impaired phosphorylation as a factor in the pathogenesis of sprue was an idea emanating from himself, whereas the arguments supporting this belief were put forward by me four years ago,[2] though doubtless Professor Maegraith has overlooked the point.

London, W.1. HUGH S. STANNUS.

CIRCULATION IN THE KIDNEY

SIR,—The preliminary communication by Trueta and his colleagues in your issue of August 17 (p. 237), and their demonstration of a diverted renal circulation following upon stimulation of afferent nerves, is at once interesting and important. The investigators are to be congratulated on their new technique, which has made their observations possible, as much as on the results so far described, and it is to be hoped that the histological investigations will be such as clearly to demonstrate, in the rabbit, the presence and character (or absence) of vasa recta and the other non-glomerular blood-channels which have been described.

It is indeed strange to read in your leading article (p. 239) that "the arrangement and functions of the vasa recta . . . have been relatively neglected," when, until this present claim of Trueta and his colleagues, it has been generally agreed that the work of Huber (1906–07), Gérard (1911), Traut (1923), and MacCallum (1926) had disproved such non-glomerular medullary supply described by Ludwig (1852), Virchow (1857), and Golubew (1893)—just as the röntgenographic studies of Katzenstein (1911), Liek (1915), and Gross (1917) had disproved the existence of large arteries arching over the pyramids, the arcuate arteries of von Ebner (1899).

In 1889 Bradford demonstrated vasoconstriction within the kidney, and resulting shrinkage, on stimulation of the splanchnic nerves, and similar reflex contraction by central stimulation of the cut sciatic nerve and vagus, and confirmed the earlier observations on the relation of the splanchnics to the output of urine by Claude Bernard (1859), and Cohnheim and Roy (1883). Burton-Opitz and Lucas (1908) showed that section of the splanchnics increases the blood-flow through the kidneys, whereas stimulation decreases the flow; and Burton-Opitz (1908) showed that the right and left splanchnics were distributed to the right and left kidneys respectively. In the frog, Bieter (1930), confirming the work of Richards and Schmidt (1924–25) and Richards (1925), recorded that stimulation of the sympathetic fibres to the kidney, and of the central end of a cut sensory nerve, such as the sciatic, produced great vasoconstriction throughout the kidney: the majority of active glomeruli stopped, showed stasis and gradual emptying of the capillaries but no inflow of red cells, while "The glomeruli which do not stop as a result of splanchnic stimulation sometimes appear to show a flow at an increased speed, as if a certain amount of arterial blood must get into the kidney regardless of the number of glomeruli that are open for flow." Andrews (1927) noted anuria in dogs following the release of tight ligatures from the leg, and Bieter repeating this in the frog noted reduced glomerular capillary activity, an effect which was removed by section of the splanchnics. Bieter (1935) observed that "it is likely that in the frog the vasomotor control of the kidney vessels is not as highly developed as it is in mammals and man, and consequently, ascending the scale, the effects would possibly be more powerful."

When it is recalled that in human cases of severe renal cortical necrosis, in which even the columns of Bertini are involved, the medulla is not necrotic and a great many of the deep (juxtamedullary) glomeruli show no stasis, that they and their wide efferents (which pass to the medulla direct) are in fact functioning, it is not unnatural to conclude that this reduced or diverted (medullary) circulation may well be maintained by these glomerular efferents—without requiring the existence of vasa recta or of the corticomedullary arteriovenous shunts described by Steinach (1884) and Spanner (1938) to explain the viability of the pyramids and the anuria.

Like circumstances obtain in the rabbit in experimental renal cortical necrosis. In the normal rabbit kidney 5–7% of the contained blood is present in the glomerular capillaries where it is changed about 5 times per second and has a probable velocity of 1–2 mm. per second. Thus if 85% of the glomeruli are involved in the necrotic process of renal cortical necrosis, the remaining 15% (large juxtamedullary glomeruli) can accommodate the whole normal glomerular capillary volume, simply by all of their capillary loops coming into play, should the minute-volume remain unaltered (personal observations on glomerular circulation). The circuit-time in this "medulla-diverted" circulation will be reduced too, for the deep glomeruli and their efferents are largest and egress is free, resulting medullary blood-channels are short and wide vis-à-vis the cortical capillary rete. In other words, from a consideration of the hæmodynamics of the renal circulation in the rabbit, it is possible to suggest that the degree and character of the altered renal circulation, as outlined by Dr. Trueta and his colleagues, and the "redistribution of blood-flow within the kidney" discussed by Professor Maegraith (p. 213), could be maintained by a circulation via the deep (subcortical or juxtamedullary) glomeruli only, the cortex being relatively avascular, by vasoconstriction of the peripheral arterial vessels in response to afferent (sciatic or other) stimuli.

But vasa recta and their loops are described, and we await with interest the first clear demonstration of these vessels (in situ), and possibly also of other non-glomerular supplies and shunts which from time to time have been described.

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1. *Lancet*, 1945, ii, 635.
2. *Trans. R. Soc. trop. Med. Hyg.* 1942, **36**, 124.

MYTH AND MUMPSIMUS

SIR,—Many of us must be grateful to Dr. Forbes for his destructive article in your issue of August 31. I have often thought that destructive thought is a valuable property. The vast accumulations of rubbish, many of them monuments to the more foolish moments of great men, need a great deal of shaking; and I do not think Dr. Forbes has gone nearly far enough.

He writes that there is only one criterion for the value of any therapeutic procedure—does it work with patients? Many theoretically sound treatments fail because they work only if the patient is isolated in an artificial environment. Take the magic bullets of Ehrlich and their later modifications. In actual practice this treatment sometimes failed, perhaps by the accidents of treatment but often by default or irregular attendance for the long and tedious courses of injections. Because of these limitations the magic looked shabby in the light of day. The failure in many cases was due to the fact that a man was primarily a lorry driver, a hotel clerk, or a commercial traveller—in other words, a human being—and only secondarily a patient with syphilis.

Any treatment that fails to recognise the human animal as a whole and its place as a social unit tends to partial success. The immobilisation of young children for long periods seems a sorry sort of treatment for a living creature; it fails in that it treats a part by maltreating the whole. Activity is an essential part of health, and far more care should be taken not to prescribe unnecessarily restrictive measures; nor should a man be taken off work without the most careful consideration. He often does better if he stays at work.

The same applies to diets. A man should enjoy his food because enjoyment is an essential part of good digestion. Very few diets are enjoyable. Is it not a fact that what we are really enduring in our ordinary dietary is not lack of calories but unmitigated English cooking? Why does the gastric-ulcer patient have his meat minced? A more horrid food than minced meat cannot be imagined, and given a reasonable set of teeth the natural act of chewing suffices; chewing, moreover, promotes digestion.

The trouble in gastric-ulcer diets is partly due to simple-minded arguing from pathology. Here, we say, is an ulcer in the stomach, it must not be irritated by pips, fruit skins, stalks, meat extracts, alcohol, or tobacco. But patients are often willing to experiment and some find beer, as well as other supposed irritants, gives them no discomfort. Many manage a practically normal diet except for greasy foods. Arguing from pathology, well-lubricated greasy foods should slide harmlessly over an ulcer. They apparently do not. Nevertheless, pathology is a valuable corrective in medicine. Unfettered by it Freud trampled on the fairy stories of Greece and raised some extraordinary myths. Worse still, the psycho-analytical school is becoming respectable—it even appears in the Brains Trust!

It seems a pity to blow up some of these picturesque ruins, but it may be necessary; besides it gives healthful pleasure to those who cannot stand bunk, especially when buttressed by authority:

Oxford. G. WHITWELL.

CALF SERUM FOR TRANSFUSION

SIR,—No doubt war-time conditions prevented Dr. Massons, of Barcelona, having access to my paper on despeciated bovine serum (*Brit. med. J.* 1944, i, 73) to which you refer in your annotation. A material somewhat similar to P.C.P. was produced in the department of surgery, University of Liverpool, by the addition of formalin and ammonia to bovine serum. The essential difference in the final production of the solution is, however, that in despeciated bovine serum the heating process is taken to 72° C only, while in P.C.P. the solution is heated to 100° C. Experiments which we did showed that the agglutinins are destroyed at 72° C, associated with changes in the globulin fraction. At this temperature the changes in the albumin fraction are small and the material still exerts an osmotic pressure of 120–160 mm. of water compared to the figure of 150 mm. of water found for pooled citrated plasma. Material heated above this temperature shows a steady decrease in the osmotic pressure until at 100° C it has none at all. The readings were taken by the micro-method of Krogh and Nakazawa against mammalian Ringer solution. It is thus difficult to see how P.C.P. can have any more beneficial effect than normal saline.

The original reason for the preparation of despeciated bovine serum was to produce a substitute for human plasma that would have been of value had the supplies of human plasma not been sufficient to meet war-time needs. When it was apparent that human material was available in sufficient quantities, further production of despeciated bovine serum was stopped. It was administered safely, however, to over 200 patients by myself and others in amounts of one pint or more, the largest volume given to one patient being 16 pints. I would reaffirm that despeciated bovine serum prepared by the Liverpool method is non-toxic, non-antigenic, free from antibodies, of an equivalent osmotic pressure to citrated human plasma, retained in the circulation, and eventually metabolised.

Liverpool. F. RONALD EDWARDS.

LATENT PERIOD IN KALA-AZAR

SIR,—The following case well illustrates the fact, pointed out by Armstrong,[1] that there may be a long latent period before kala-azar produces symptoms. This seems to be fairly well known, but is nowhere else emphasised in the published work. Manson-Bahr [2] suggests six months as the upper limit of the incubation period, and Strong [3] and Scovel [4] suggest four months as the maximum; but none of these authors draws attention to the further latent period which may occur before symptoms appear. Manson-Bahr notes that the disease may remain latent for many months in artificially infected dogs, and Sweeney et al.[5] describe a case with a "presumptive latent period of two years," as in the present case.

A private, aged 26, served from April, 1940, to December, 1943, in Eritrea, Egypt, Libya, Palestine, and Syria, and from December, 1943, to February, 1944, in Italy. His disease probably originated before December, 1943, after which date he was stationed north of Naples.

In the summer of 1945 he noted that his belt seemed tight on exercise, but otherwise he felt perfectly fit. In October, 1945, he was admitted to hospital with a history of coryza for about a month, and of headache, shivering, and sweating for several days.

He was thin and pale, with a yellowish tinge to the skin, and had a swinging temperature rising to 100°–103° F every evening, accompanied by profuse sweats. A large tumour was present in the left hypochondrium extending to below the level of the umbilicus. The nature of this tumour remained in doubt, it being considered to be either the spleen or the left kidney. An intravenous pyelogram did not help, because no dye was excreted on the left side; and an attempt at ascending pyelography was unsuccessful. The liver was not palpable, and no enlarged glands were felt.

Blood-count: red cells 2,030,000 per c.mm., Hb 48% (14·5 g. per 100 c.cm.), colour-index 1·1; white cells 2650 per c.mm. (polymorphs 50%, lymphocytes 25%, monocytes 10%, eosinophils 1%, myelocytes 3%, myeloblasts 3%, unclassified 2%). Plasma protein 7·55 g. per 100 c.cm.

Sternal puncture gave a marrow count of polymorphs 8%, myelocytes 40%, metamyelocytes 3%, lymphocytes 0, monocytes 0, normoblasts 6%, premyelocytes 6%, myeloblasts 4%, erythroblasts 33%, megaloblasts 0. No Leishman-Donovan bodies were seen.

Other investigations all proved negative, and further blood-counts and sternal punctures showed a similar picture, Leishman-Donovan bodies still being absent from marrow smears. Patient's condition altered little, and the high evening temperature and profuse sweats continued.

In view of the continued doubt in diagnosis, laparotomy was done on Nov. 23, after transfusion with packed cells. The tumour was found to be a grossly enlarged spleen. No other abnormality was found in the abdomen. Splenic puncture

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2. Manson-Bahr, P. H. Manson's Tropical Diseases, London, 1945, p. 156.
3. Strong, R. P. Stitt's Diagnosis, Prevention, and Treatment of Tropical Diseases, Philadelphia, 1944.
4. Scovel, F. G. *Ann intern. Med.* 1944, **21**, 607.
5. Sweeney, J. S., Friedlander, R. D., Queen, F. B. *J. Amer. med. Ass.* 1945, **128**, 1020.

was done, but no Leishman-Donovan bodies were found either on direct examination of the biopsy specimen or on culture.

On Dec. 18, as there was no improvement, it was decided to treat the case as kala-azar, and a course of stilbamidine 0·075 g. followed by 0·15 g. daily to a total dosage of 2·25 g. was given. The sweating began to decrease after six or seven days, but the temperature did not respond till the thirteenth day of the course, when it dropped suddenly and thereafter remained low.

On Dec. 25 culture of marrow blood in Lache-dextrose sloppy agar with defibrinated rabbit blood at 24° C grew "distinct leptomonas forms of Leishman-Donovan bodies, fresh preparations showing characteristic motility."

Progress was slow but excellent, the anæmia improving and the spleen decreasing in size. In February, 1946, patient was given a course of urea stilbamidine. In March his general condition was most satisfactory, the spleen being just palpable and the anæmia clearing well. In April, 1946, he reported numbness of forehead, cheeks, and lips, but was otherwise well.

The chief points of interest in this case are the long latent period, the difficulty in diagnosis, and the dangers of Vth nerve involvement when stilbamidine is used.

A. P. NORMAN.

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*** L. E. Napier, writing in the *British Encyclopædia of Medical Practice* (London, 1938, vol. VII, p. 342), mentions a patient who developed symptoms of kala-azar after being away from any endemic area for 18 months.—ED. L.

CHILDREN WHO SPEND TOO LONG IN BED

SIR,—Dr. McCluskie, in his letter of Sept. 14, replying to my criticisms of his article, has so far retracted as to say that the time of sleep required by a child may vary by "an hour, or more, or less": this period of an hour was not mentioned in the original article. He reaffirms his statement, with which no-one will disagree, that many children spend too long in bed: but he does not explain how the mother with two or more small children, and little or no domestic help, can follow the "detailed directions" which he thinks necessary for sleeping as well as feeding.

He has also failed to produce any evidence for the dogmatic statements in his article that "if a baby has an hour too much sleep during the day it will certainly cry during the night," and "variation by even 15–30 minutes from the amount of sleep each particular child requires at each month produces violent change of behaviour." If "years of experience with children" lead him to these conclusions, I can only assume that his experience has been limited to dealing with rather unusual children. A perceptive mother recognises that external factors such as the activities of the day, physical and mental, produce variations in the amount of sleep required: and I think it a facile assumption that the behaviour disorders which Dr. McCluskie describes can be so directly related to lack or excess of sleep. In his *Contributions to Analytical Psychology* Jung says that "the neuroses of children are rather symptoms of the parents' mental condition than a genuine disease of the child."

I should be glad to know the signs and symptoms of "a nation-strangling matriarchy."

London, W.11. CATHERINE STORR.

SIR,—Dr. McCluskie gives good advice concerning hours of sleep for children. One cannot make a child sleep to suit one's convenience. I suggest that, if he wakens early, the child might be encouraged to play quietly with some toys, after being made comfortable, until his mother is ready to dress him and give him his breakfast. I consider that an average baby of a few months requires more sleep than Dr. McCluskie prescribes. A baby wakened too long before his feed will get tired and fretful. A contented baby soon learns to adjust his own sleeping hours to his individual needs. He will lie playing with his hands, and later practising making new noises, and a busy mother will be unaware when he wakened or fell asleep again. He should be as happy in his pram as anywhere, though he will enjoy a regular kicking time to exercise his limbs; this time can be increased in length to correspond with his abilities.

Eastbourne. JOAN BRIGDEN.

EPIDEMIC THROMBOPHLEBITIS

SIR,—There seems little doubt that the condition described by Lieut.-Colonel Manson-Bahr and Dr. Charters (Sept. 7, p. 333) is the tropical primary phlebitis described in 1941 by one of us [1] as occurring in Northern Rhodesia. Since then this disease has been studied further, and our observations on 71 cases will shortly be ready for publication. Manson-Bahr and Charters state that they find no histological cause for the thrombosis. The histological appearances in the vein wall described in 1941 were acknowledged then as obviously abnormal (A. C. L.) but the interpretation of these and of a subsequently observed chronic case with giant cells (cf. Manson-Bahr's case, p. 334) was at last made clear by a recent opportunity to study what is certainly the essential lesion. It had come to be appreciated (A. C. F.) that only a short stretch of the vein was primarily involved, and microscopy of this zone has now revealed a peculiar form of inflammation characterised by extreme proliferation of young capillaries in the disrupted media of the vein, and by the presence of phloxinophil intracytoplasmic inclusions.

Luanshya, Northern Rhodesia, and Department of Pathology, University of Glasgow. A. C. FISHER. A. C. LENDRUM.

ROYAL COLLEGE OF PHYSICIANS OF LONDON

SIR,—A letter in the *British Medical Journal* of August 31 (p. 313) has focused attention once more on the statutes, by-laws, and regulations of the Royal College of Physicians and the justifiable discontent which they arouse.

As is well known, the present regulations do not allow members to take any part in the running of the college. In fact, they are specifically debarred from doing so under by-law 118, which says ". . . they shall not be entitled to any share in the Government, or to attend or vote at General Meetings of the Corporation." Surely this state of affairs is quite out of date, and in view of the great changes now taking place the time is ripe for the college to broaden its representation with a view to ensuring that members obtain a voice in its counsels and deliberations on common-sense, democratic lines.

The college, instead of remaining a mere academic institution, should become a living force, capable of exercising a profound influence for good on various medical, social, and educational problems confronting us and pressing urgently for solution.

The first step in this desirable aim must surely be the provision of facilities for adequate representation by the members, who should be given every encouragement to form their own standing committee, &c., and take an active part in the management of the college. Obviously one of the important tasks of any newly elected committee should be to go into the question of the revision of the existing regulations concerning the election of fellows.

C. ANDERSON.
M. N. PAI.
Sutton Emergency Hospital. D. SHAW.

EFFICACY OF THE PENICILLINS

SIR,—Your leading article of Sept. 14 directs attention to the desirability of ensuring that penicillin used in medicine shall, as far as practicable, consist only of penicillin II (G). For some time past we have been fully conscious of this, and, by the choice of appropriate media and precursors, together with the use of selective extraction procedures, we have secured approximately 90% of penicillin II (G) in our product. As a further precaution, our vials are now filled so that, within the limits imposed by existing assay procedures, we believe them to contain the stated content of penicillin II (G)—i.e., if a vial is claimed to contain 100,000 units of penicillin, it contains not less than that number of units of penicillin II (G), and any small proportion of penicillin IV (K) which may be present is additional. In this manner the practitioner is assured of the full dosage of the penicillin on which he relies for therapeutic efficacy.

H. JEPHCOTT
Managing Director,
Greenford, Middlesex. Glaxo Laboratories Ltd.

1. Fisher, A. C. *S. Afr. med. J.* 1941, **15**, 131.

Notes and News

CRICHTON ROYAL FELLOWSHIPS

TODAY some inside knowledge of the working of a modern psychiatric hospital is essential for the consultant, and many established specialists have been spending a busman's holiday visiting their colleagues at the Crichton Royal, Dumfries. To fill this gap and to hasten the fuller training in psychiatry lately recommended by the Royal College of Physicians, the board of directors of the Crichton Royal have set up three fellowships, in addition to the ordinary staff of the hospital. The fellows will receive training in all branches of clinical psychiatry, including fever treatment, prolonged narcosis, electric convulsion therapy, insulin therapy, and leucotomy. They will have opportunities to work in the outpatient and child-guidance clinics, to join in the work of the psychiatric social worker, and take part in home and follow-up visits. Each fellow will be attached to one of the senior psychiatrists who will be responsible for his instruction, and later patients will be allotted to him. He will also attend all clinical staff meetings and become familiar with the management of different wards, the legal problems of psychiatry, and routine psychological testing. The fellowships, which carry a salary of £400 a year in addition to residential emoluments, will in the first instance be tenable for one year from Feb. 1, 1947. Forms of application may be obtained from the physician superintendent of the hospital and should be returned not later than Dec. 16.

ART FOR THE ILL

Adrian Hill, an artist, had tuberculosis, and during his long boring convalescence found how quickly he could make the hands of the clock move by sketching in pencil or water-colour. When he got up he shared this device for passing the time with his fellow patients, and, partly no doubt owing to his own ability to instruct and interest, found many who could equal his pleasure in making pictures, if not his technical skill. He has written a likeable book (*Art versus Illness*, George Allen and Unwin, 10*s*. 6*d*.) about this small start in a new type of occupational therapy and its considerable developments. He found a starved taste for pictures in many unlikely quarters, and in others a bent for original work which needed only opportunity to grow. His experiment seems likely to become an accepted part of treatment in some sanatoria and should be seriously considered in all. His amusing and constructive little book, illustrated with many of his own drawings and those of his patient-pupils, is well worth reading with this idea in mind.

DELINQUENCY ON THE SCREEN

THE approved schools usually carry on their constructive work without much publicity, but their achievements are so notable that they should be widely understood. *Children on Trial*, a Crown Film Production now showing at the Academy Cinema, furthers this end and also adds to the high reputation of British documentaries. The stories of three delinquent young people are outlined without any emotional emphasis, and the result is not only moving but intensely interesting —far more so, indeed, than the average thriller. The delinquencies are not understated, the extenuating circumstances kept in perspective, the approved school with its scope for growth of mind, body, and spirit presented fairly. The cast includes only two professional actors, one of whom plays the delinquent girl, the other the headmaster of the approved school. The other actors are taking their natural parts, the boys being played by Liverpool and Birmingham schoolboys. The boy playing the main delinquent has a natural economy of expression and gesture which could not be bettered. Doctors should try to see this informative film.

Family Planning Association

The association is holding a conference on Infertility, on Sept. 21 and 22, at the National Institute for Medical Research, Hampstead, N.W.3. At 3 P.M. on Saturday, the 21st, Dr. Mary Barton will speak on the Biology of the Cervix, and Dr. G. I. M. Swyer on the Rôle of Hyaluronidase in Fertilisation. There will be demonstrations at 5 P.M., and afterwards Dr. Audrey Smith and Mr. A. S. Parkes, F.R.S., will read a paper on Antigenic Properties of Spermatozoa. On Sunday, the 22nd, at 11 A.M., Dr. Margaret Hadley Jackson and Mrs. C. Harvey will speak on Experience with A.I.H., Dr. Muriel Rose on the Prognostic Value of Semen Examination, and Dr. Raymond Cross on Habitual Abortion. Further particulars may be had from the secretary, 69, Eccleston Square, London, S.W.1.

University of Edinburgh

Mr. D. M. Douglas has been appointed lecturer in experimental surgery in the university, and deputy director of the Wilkie Surgical Research Laboratory. He has also been elected to the staff of the Royal Infirmary as an associate assistant surgeon.

University of Glasgow

Dr. Thomas Anderson, physician superintendent of Knightswood Hospital, Glasgow, has been appointed full-time lecturer in infectious diseases in the university. The lectureship which the university has set up after consultation with the city corporation is the first full-time one in this country and carries with it the title of visiting physician to Knightswood Hospital, so that the holder may have adequate clinical material for teaching and research. Dr. Anderson will also become consultant in infectious diseases to the corporation. The salary scale of the lectureship is to be £1200–£50–£1500.

Dr. Anderson, who graduated M.B. at the University of Glasgow in 1928, held a resident appointment at the Western Infirmary and later became deputy physician superintendent at Ruchill Fever Hospital. He was elected F.R.C.P.E. in 1940, and obtained his M.D. with honours last year. His published work includes papers on the use of chemotherapeutics in infectious diseases, particularly pneumonia.

Royal College of Obstetricians and Gynæcologists

On Sept. 27 the honorary fellowship of the college will be conferred on Mr. Victor Bonney in recognition of his services to British gynæcology.

Travelling Fellowships

The Medical Research Council have awarded Rockefeller medical fellowships for 1946–47 to the following:

SHEILA T. E. CALLENDER, M.D. St. And., M.R.C.P., graduate assistant, Nuffield Department of Clinical Medicine, Oxford.

C. E. DENT, M.B. Lond., M.R.C.P., research assistant, medical unit, University College Hospital, London.

A. M. JONES, M.B. Manc., M.R.C.P., Leverhulme research scholar (Royal College of Physicians), University and Royal Infirmary, Manchester.

A. M. MACDONALD, M.D. Edin., F.R.C.P.E., department of pathology, Edinburgh University.

J. E. MORISON, M.D. Belf., lecturer in morbid anatomy, Queen's University, Belfast.

F. T. C. PRUNTY, M.D. Camb., M.R.C.P., lecturer in chemical pathology, St. Thomas's Hospital medical school, London.

F. F. RUNDLE, M.D. Sydney, F.R.C.S., surgical specialist, R.A.M.C., lately chief assistant and registrar, Westminster Hospital, London.

JOHN SWINNEY, M.C., M.D., M.S. Durh., assistant surgeon, department of urological surgery, Newcastle-on-Tyne General Hospital.

The council have also awarded a Dorothy Temple Cross research fellowship in tuberculosis to:

T. F. JARMAN, M.D. Durh., assistant tuberculosis physician, Welsh National Memorial Association.

International Society of Medical Hydrology

This society is holding its first post-war meeting at Buxton from Oct. 4 to 6. The speakers will include Dr. J. van Breemen (Four Causal Factors of Rheumatic Disease in Connexion with Medical Hydrology), Mr. R. Whittington (Plasma Viscosity), Dr. Victor Ott (Present Swiss Concepts of Rheumatism and Physical Medicine), Dr. Abraham Cohen (Physostigmine in Rheumatoid Arthritis), and Dr. Louis T. Swaim (American Concepts on Arthritis). Further particulars may be had from Dr. Donald Wilson, 28, The Circus, Bath.

Service Prizes

The R.A.M.C. Prize Funds Committee announce that the following prizes are open for award in 1947 after a lapse of some eight years due to the war:

Leishman Memorial Prize.—A silver medal and £30 for the best work in any branch of medicine, surgery, or the allied sciences, or in connexion with the general duties of the R.A.M.C. or of the Army Dental Corps.

Alexander Memorial Prize.—A silver medal and £70 to the officer who during the year has done most to promote the study and improvement of military medicine, surgery, hygiene, or pathology.

Parkes Memorial Prize.—A silver-gilt medal and £60 to the regular serving medical officer who has done most to promote the study of naval or military hygiene.

The Alexander and Parkes prizes are not open to officers on the staffs of the Royal Naval Medical School, the Royal Army Medical College, or the Army School of Hygiene. In making these two awards first consideration will be given to original articles published in a medical journal, and part authorship will not justify the recommendation of an officer for these prizes.

Recommendations should be sent through the usual channels, with copies of original articles and reports, to reach the hon. secretary of the committee, R.A.M. College, Millbank, London, S.W.1, by Dec. 31.

Middlesex Hospital

The annual dinner will be held at the Savoy Hotel, London, W.C.2, on Friday, Oct. 4, at 7.30 P.M.

Nutrition Society

The society is holding a conference on The Work and Aims of the Food and Agriculture Organisation on Saturday, Sept. 21, at 10.30 A.M., at the London School of Hygiene, Keppel Street, London, W.C.1. The speakers will include Sir John Orr, F.R.S., director-general of F.A.O.; Mr. D. Lubbock; Dr. P. Lamartine Yates; Dr. W. R. Aykroyd; and Miss E. Fautz.

Medical Society of the L.C.C.

There will be a clinical meeting of the society on Thursday, Oct. 3, at 3 P.M., at Dulwich Hospital, S.E.22, when the staffs of Dulwich and St. Olave's Hospitals will demonstrate cases.

Association of Industrial Medical Officers

The annual general meeting of the association will be held at the London School of Hygiene, Keppel Street, W.C.1, on Friday, Oct. 18th, at 5 P.M., and will be followed by a dinner at 7.30 P.M. On Saturday, the 19th, at 10.30 A.M., Dr. Donald Hunter and Dr. R. S. F. Schilling will speak on Industrial Medicine in the U.S.A.

St. Thomas's Hospital

Dr. A. L. Crockford has been appointed secretary of the medical school in succession to Dr. R. J. C. Thompson, who has resigned.

Brazilian Honour

The Brazilian order of the Southern Cross has been conferred on Sir Alexander Fleming, F.R.S., who presided over the Inter-American medical congress which met in Rio de Janeiro this month.

Return to Practice

The Central Medical War Committee announces that Dr. Kenneth O. Black, 27, Weymouth Street, W.1 (Langham 3336), has resumed civilian practice.

Births, Marriages, and Deaths

BIRTHS

DUTTON.—On Sept. 10, in Manchester, the wife of Captain G. C. D. Dutton, R.A.M.C.—a daughter.

HACKETT.—On Sept. 8, the wife of Dr. C. J. Hackett, of Wendover, Bucks—a son.

HIBBERT.—On Sept. 13, in Liverpool, the wife of Dr. Geoffrey Hibbert—a son.

HUSTON.—On Sept. 7, the wife of Lieut.-Colonel John Huston, R.A.M.C., of Edinburgh—a daughter.

LILLICRAP.—On Sept. 12, at Lincoln, the wife of Dr. Charles Lillicrap—a son.

LOGIE.—On Sept. 9, at Aberdeen, the wife of Mr. Norman Logie, F.R.C.S.—a son.

MARRIOTT.—On Sept. 11, in London, the wife of Dr. Ian Marriott—a son.

MAY.—On Sept. 8, at Chatham, the wife of Surgeon Lieut.-Commander R. T. May, R.N.—a son.

PORTER.—On Sept. 6, at Woking, the wife of Dr. H. L. Porter—a son.

SMITH.—On Sept. 7, in London, the wife of Dr. J. F. Smith—a son.

VICARY.—On Sept. 12, Dr. Patricia Vicary (née Shaw), the wife of Dr. Peter Vicary, of London, W.14—a son.

WYNNE.—On Sept. 7, the wife of Dr. Roger Wynne, of Banbury—a daughter.

YUDKIN.—On Sept. 7, the wife of Dr. Simon Yudkin—a daughter.

MARRIAGES

AMBROSE—CLAVERING.—On Sept. 11, in London, Gordon Ambrose, L.M.S.S.A., to Sheila Clavering.

BENNETT—MELLING.—On Sept. 7, at Baylham, Harold Stanley Bennett, M.B., R.A.F.V.R., to Barbara Hunter Melling.

REID—SHARPE.—On August 31, in Calcutta, Grainger Wilson Reid, lieut-colonel R.A.M.C., to Ruth Hilda Sharpe, Q.A.I.M.N.S./R.

WALKER—JONES.—On June 14, in Nairobi, D. O. Walker, major R.A.M.C., to Mary Jones, Q.A.I.M.N.S./R.

DEATHS

BEEVOR.—On Sept. 15, at Burnham, Bucks, Charles Ferrier Beevor, M.A., B.M. Oxfd.

GOLDEN.—On Sept. 8, at Ilford, Michael Bruce Howard Golden, M.R.C.S.

GRAY.—On Sept. 12, at Dalkeith, Midlothian, George Douglas Gray, C.B.E., M.D. Edin., late lieut.-colonel R.A.M.C.

HILL.—On Sept. 8, at St. Mary Bourne, Hampshire, Alfred Arthur Hill, M.D. Durh.

HOWIE.—On Sept. 7, Mary Evelyn Howie, M.B. Durh., of Gosforth, Newcastle-on-Tyne.

PATON.—On Sept. 9, at St. Albans, Herts, Richard Reid Kirkwood Paton, M.B. Glasg., D.P.H.

SLAYTER.—On August 22, in Madras, Edward Wheeler Slayter, C.M.G., D.S.O., M.B. Edin., late colonel R.A.M.C., retd., of Halifax, Nova Scotia.

STREET.—On Sept. 8, at Crowborough, Ashton Street, M.B. Camb., F.R.C.S., lieut.-colonel I.M.S., aged 82.

WILSON.—On Sept. 10, in Cardiff, James William Albert Wilson, M.D. Belf.

Medical Diary

SEPT. 22 TO 28

Monday, 23rd

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
3.45 P.M. Prof. R. A. Willis: Experimental Production of Tumours.
5 P.M. Dr. N. F. Maclagan: Basal Metabolism.

Tuesday, 24th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. R. A. Willis: Statistical Study of Tumours.
5 P.M. Dr. L. E. Glynn: Nutritional Factors, Hepatotoxic Agents, and Liver Function.

MEDICAL WOMEN'S FEDERATION
8.30 P.M. (B.M.A. House, W.C.1.) Dr. Henriette Lohr: Medicine in Holland under German Occupation.

Wednesday, 25th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. F. Wood Jones, F.R.S.: Development and Structure of the Palate.
5 P.M. Dr. L. E. Glynn: Nutritional Factors, Hepatotoxic Agents, and Liver Function.

UNIVERSITY OF GLASGOW
8 P.M. (Department of Ophthalmology.) Dr. J. B. Gaylor: Electroencephalography in Retinal Disease.

Thursday, 26th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Dr. D. V. Davies: Development of Joints in General.
5 P.M. Prof. W. G. Barnard: Selection of Site and Specificity of Reaction in Inflammation.

Friday, 27th

ROYAL COLLEGE OF SURGEONS
3.45 P.M. Prof. H. A. Harris: The Nerve Plexuses of the Limbs.
5 P.M. Prof. G. Hadfield: The Reticuloses.

BIOCHEMICAL SOCIETY
11 A.M. (University of Liverpool.) Short communications.

Appointments

BICKFORD, B. J., M.B. Lond., F.R.C.S.: surgical registrar, Liverpool Chest Surgical Unit at Broadgreen Hospital.

GOLDMAN, H. P., M.B. Glasg., M.R.C.P.: physician, Bolton Royal Infirmary.

INGHAM, ARTHUR, M.B. Manc.: physician, Bolton Royal Infirmary.

MOORE, THOMAS, M.D., M.S. Durh., F.R.C.S.: surgeon, Duchess of York Hospital for Babies, Manchester.

PROBYN-WILLIAMS, R. C., B.M. Oxfd: examining factory surgeon, Wotton-under-Edge, Gloucester.

THEOBALD, G. W., M.D. Lond., F.R.C.O.G.: visiting obstetrician and gynecologist, Royal Infirmary, Bradford.

WARDLE, V. H., M.C., L.R.C.P.E.: examining factory surgeon, Bishop Auckland, Durham.

Colonial Medical Service:

BAIRD, R. B., M.B. Edin.: M.O., Uganda.

BARNETT, Surgeon Lieut.-Commander A. M., M.R.C.S.: M.O., Tanganyika.

BARRETT, R. E., M.B. Lond., D.T.M. & H.: senior M.O., Uganda.

BARTON, W. L., M.B. Edin.: M.O., Kenya.

BISLEY, Squadron-Leader G. G., M.R.C.S.: M.O., Kenya.

BUCK, Major S. C., M.B. Camb.: M.O. (pathologist), Northern Rhodesia.

BURKITT, Major D. P., M.B. Dubl., F.R.C.S.E.: M.O., Uganda.

CALVERT, MARY, M.B. Belf.: M.O., Nigeria.

CANDLER, Lieut.-Colonel P. L., M.B. Camb.: M.O., Kenya.

CHEVERTON, R. L., M.R.C.S.: A.D.M.S., Nigeria.

CONNELLY, Wing-Commander J. R., L.R.C.P.E.: M.O., Kenya.

CONNOLLY, P. P. D., M.B. Belf.: senior M.O., Tanganyika.

COOMBES, A. H. R., M.R.C.S.: M.O., Hong-Kong.

CUMMINGS, W. L., M.B. Edin.: district M.O., St. Vincent, Windward Islands.

EVANS, Surgeon Lieutenant A. J.: M.O., Northern Rhodesia.

FRANKS, Surgeon Lieutenant A. C., M.R.C.S.: M.O., Tanganyika.

GRIFFITHS, Major P. G., M.C., M.B. Manc.: M.O., Fiji.

GURD, C. H., M.B. Brist.: M.O., St. Helena.

HALL, C. L., B.M. Oxfd: M.O., Tanganyika.

HÉTREED, V. W. J., B.M. Lond.: M.O., Nigeria.

HIRST, A. E. E., M.B.: M.O.H. (grade C), Trinidad.

HOLLOWAY, R., M.D.: M.O., Hong-Kong.

HOWELL, A. T., M.B. Camb.: A.D.M.S., Kenya.

HUGHES, M. H., B.M. Oxfd: M.O., Gold Coast.

KETER, MARY C., M.B. Glasg.: M.O., Nigeria.

LEITCH, NEIL, B.M. Oxfd: M.O., Nigeria.

MCDONALD, J. H., M.B. Aberd.: senior M.O., Tanganyika.

MCKENZIE, A., M.B. Lond.: A.D.M.S., Tanganyika.

NICKLIN, REGINALD, M.B. Birm.: senior M.O., Northern Rhodesia.

O'KANE, R., M.B.: M.O., Malaya.

PHILIP, C. R., O.B.E., M.D. Aberd.: A.D.M.S., Kenya.

SANDERSON, N. D., M.B. Edin.: senior M.O., Northern Rhodesia.

SHEFFIELD, WILLIAM, M.B. Leeds: M.O., Northern Rhodesia.

THOM, W. T., M.B. Edin.: M.O., Tanganyika.

WARNER, O. F., L.R.C.P.E.: M.O. (grade B), Trinidad.

WILLIS, J., M.D.: M.O., Hong-Kong.

Dr. E. H. VAN SOMEREN.—A footnote in a recent book of memoirs states that Dr. van Someren, who practised in Venice from 1898 to 1913, suffered from melancholia and committed suicide in Venice. His obituary notices (see *Lancet*, 1913, i, 793; *Brit. med. J.* 1913, i, 589) make it clear that he died at Syracuse after a short illness at the age of 41; he was a diabetic and died in coma after contracting influenza.

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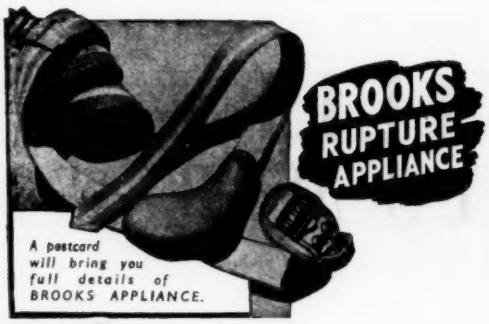

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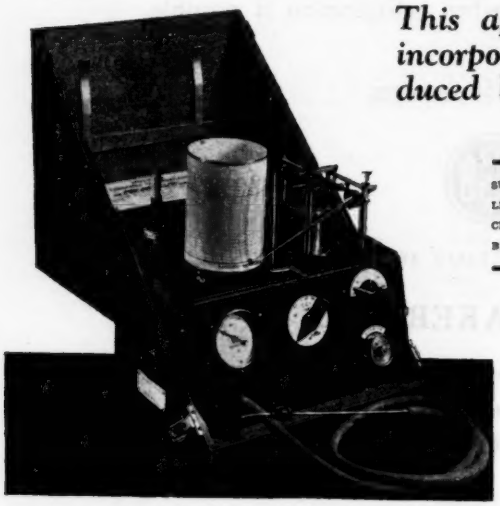

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Cases of Alcoholism and Drug Addiction admitted. General amenities of highest standard. Every facility for all forms of treatment, including insulin and prefrontal leucotomy. Terms moderate.
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A PRIVATE HOSPITAL for the treatment of mental and nervous illnesses. Conveniently situated and easy of access from all parts. Six acres of ground, facing Finsbury Park. Voluntary and Temporary Patients received without certification. E.C.T. Shock therapy, Psychotherapy, and other modern forms of treatment. Telephone: STAmford Hill 7866/7 (2 lines). Telegrams: "Subsidiary, London."
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Terms moderate Apply to Resident Medical Superintendent
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FOR NERVOUS AND MENTAL DISORDERS

NORTHAMPTON

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This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, biochemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

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This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods: insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombières treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for biochemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

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Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

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The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

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A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS

Extensive grounds. Detached Villas. Chapel. Garden Produce from own gardens. Terms very moderate.

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NERVOUS AND MENTAL DISORDER

by modern methods, after full investigation

Voluntary, Temporary and Certified Patients

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For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism and Drug Addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *Telephone:* Ashton-in-Makerfield 7311. *Telegraphic Address:* Wootton, Ashton-in-Makerfield.

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A Private Clinic, the first in Great Britain, for investigation and treatment of all forms of disease, except infectious and mental

Nursing, dietetic, massage, x-ray and laboratory departments **Central heating and a lift to all floors**

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A Private Hospital for the Treatment and Care of Mental and Nervous Illnesses in both Sexes.

A modern country house, 12 miles from Marble Arch, in attractive and secluded surroundings. Fees from 10 guineas per week inclusive. Cases under Certificate, Voluntary and Temporary Patients received for treatment.

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A REGISTERED HOSPITAL FOR THE TREATMENT OF MENTAL DISORDERS OF THE EDUCATED CLASSES

Cases under certificate, voluntary and temporary patients, received for treatment. Modern methods of treatment available. Terms moderate Seaside Branch at Newlands, Dawlish

Apply: Medical Superintendent Tel.: Exeter 2642

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The Medical Faculty at this College of the University gives instruction in the subjects of Medical Science for all the usual Intermediate and pre-clinical Examinations in Medicine, Surgery, and Dentistry. Through the four associated hospitals, students of the College have clinical facility of over 1000 beds.

The Medical Faculty of the College provides a general University education in touch with other Faculties, classes of which medical students are permitted to attend. There are many College societies, clubs, and functions, in which students of all Faculties have opportunity of meeting each other. The College has an excellent athletic ground at Mitcham with a new and well-equipped pavilion.

The First Year subjects are taught in the Departments of the Faculty of Natural Science and those for the Second and Third Years in the Faculty of Medical Science. This consists of the Hambleden Department of Anatomy and the extensive Department of Physiology. The buildings of these Departments provide the College with a complete Medical Faculty which embodies the newest up-to-date ideas in laboratory construction and equipment.

Valuable Scholarships and Prizes are awarded on the results of examinations held annually.

S. T. SHOVELTON, M.A., Secretary.
Strand, W.C.2.

FENSTANTON at "FIVE DIAMONDS" Chalfont St. Giles, Bucks

A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders. Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (See *Medical Directory*, p. 2507.) Apply Resident Physician. Telephone: Little Chalfont 2046 Station: Chalfont and Latimer

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For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

THE UNIVERSITY OF LIVERPOOL

DEPARTMENT OF CHILD HEALTH

REFRESHER COURSE

An intensive full-time 3-week course in Pædiatrics will be conducted by the Professor and Staff of the Department of Child Health in the Department and Hospitals of the Clinical School from MONDAY, 4TH TO SATURDAY, 23RD NOVEMBER.

The course, while designed primarily as a refresher in Child Health generally, should be found suitable for those preparing for the Diploma in Child Health (D.C.H.).

The number of candidates will be limited to 20, and the fees have been fixed at 10 guineas (7½ guineas for ex-Forces candidates eligible for refresher courses under the Rehabilitation Scheme).

Those wishing to enrol for the course should apply to the Dean of the Faculty of Medicine before 15th October

TUBERCULOSIS EDUCATIONAL INSTITUTE

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at the Literary and Philosophical Library (lecture room), Westgate-road, Newcastle-upon-Tyne.

for Medical Practitioners and Tuberculosis Officers on

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Apply to: HARLEY WILLIAMS, M.D., Tavistock House North, W.C.1.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE

The Eighth GENERAL REFRESHER COURSE, primarily for demobilised Medical Officers (Class 2), will commence at 9 A.M. on MONDAY, 2ND DECEMBER, in the Lecture Theatre of the Department of Child Life and Health, 19, Chalmers-street.

Applications to Director of Postgraduate Studies, University New Buildings, Edinburgh, 8.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE

A 5 weeks' course in DISEASES OF THE EAR, NOSE, AND THROAT will start at 10 A.M. on MONDAY, 7TH OCTOBER, in the Royal Infirmary. The course will include both clinical and systematic instruction. Numbers are restricted to a maximum of 20 and a minimum of 10. Fee 20 guineas.

Apply: Director of Studies, University New Buildings, Edinburgh, 8.

EGYPTIAN INSTITUTE

A Lecture on MODERN MEDICINE IN EGYPT by Dr. A. A. FAMI, M.D. (Cairo), M.R.C.P. (London), Assistant Professor of Medicine, Cairo University, will be given on MONDAY, 30TH SEPTEMBER, 1946, at 6.30 P.M., at 4, Chesterfield-gardens, Curzon-street, London, W.1.

Tea at 6 P.M. Admission free.

CRICHTON ROYAL FELLOWSHIPS. The Board of Directors of the Crichton Royal have established 3 Fellowships for the training of specialists in psychiatry, each carrying a salary of £400 a year, plus the usual residential emoluments. The Fellowships are in addition to the ordinary staff of the Hospital. The Fellow will receive training in all branches of clinical psychiatry, including work in outpatient and child guidance clinics, by the senior members of the medical staff. The Fellowships will be tenable for 1 year, starting from 1st February, 1947, but may be prolonged for another year. Previous general hospital experience essential.

Application form and syllabus are obtainable from the Physician-Superintendent, Crichton Royal, Dumfries, and should be returned not later than 16th December, 1946.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL. Applications are invited for the appointment of Part-time SURGICAL REGISTRAR (Male), duties to commence 1st November. Candidates must be Fellows of the Royal College of Surgeons. Salary 200 guineas a year. The appointment is for 12 months, renewable for a further 12 months on the recommendation of the Medical Board.

Applications, with copies of recent testimonials, to be addressed to the Secretary, 234, Great Portland-street, W.1, by 14th October.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, N.W.8. Applications are invited for the post of SECOND RADIOLOGIST. The post will carry an honorarium of £100 p.a., with a share of private patients' fees.

Applications, accompanied by copies of 3 recent testimonials, must reach the undersigned on or before 30th September, 1946.

F. DUDLEY HOBBS, M.A., Secretary.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of HONORARY ASSISTANT AURAL SURGEON to the Hospital. Candidates must be Fellows of the Royal College of Surgeons (England).

6 copies of applications and of 3 testimonials should be sent to the House Governor and must arrive not later than 1st December, 1946. This advertisement is a repetition of part of that which appeared in this Journal of 23rd February last.

H. BRIERLEY, House Governor.

ST. THOMAS'S HOSPITAL, London, S.E.1. Applications, including those from practitioners serving with H.M. Forces, are invited for the post of HONORARY OPHTHALMIC SURGEON to the Hospital. The Honorary Ophthalmic Surgeon to Outpatients will be a candidate, and, if he is appointed, there will be a vacancy for an HONORARY OPHTHALMIC SURGEON TO OUTPATIENTS. Candidates must be Fellows of the Royal College of Surgeons.

20 copies of applications, which should include details of age, qualifications, and experience, and the names and addresses of 3 referees to whom the Hospital may write, should be sent by 30th September, 1946, to Clerk of the Governors, to whom further inquiries should be addressed.

ROYAL FREE HOSPITAL, Gray's Inn-road, London, W.C.1. Applications are invited for the post of REGISTRAR (B1) in the Medical Rehabilitation Unit. Applicants for the post must either hold the Diploma in Physical Medicine or be prepared to take it. Experience in rehabilitation and all aspects of physical medicine and occupational therapy will be required from candidates. The appointment will be for 1 year in the first instance. Salary £350. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Applications, stating age, and accompanied by copies of 3 recent testimonials and a photograph, should be sent on or before 12th October, 1946, to: RICHARD T. BARTLEY, Secretary.

EAST HAM MEMORIAL HOSPITAL, Shrewsbury-road, London, E.7. Applications are invited from registered medical practitioners for the appointment of RESIDENT OBSTETRIC OFFICER (B1), to become vacant on 1st October. Salary £175 p.a., plus a temporary bonus of at present £87 10s. p.a., with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply.

Applications, together with copies of 3 recent testimonials, should be sent immediately to—

REGINALD PERRY, Secretary-Superintendent.

THE ROYAL DENTAL HOSPITAL OF LONDON, Leicester-square, W.C.2. Applications are invited from registered dental surgeons who also hold medical qualifications for the appointment of MEDICAL REGISTRAR, to become vacant 1st January, 1947. The appointment is for 1 year with a maximum period of 3 years. Salary £550–£700, according to experience—with annual increments—maximum £750 p.a. Private practice not permitted.

Applications (25 copies), stating age, nationality, qualifications with dates, experience, and details of previous appointments, and copies of 3 recent testimonials, should be sent not later than Monday, 28th October, to—

W. J. ICKERINGILL, Secretary-Superintendent.

THE WILLESDEN GENERAL HOSPITAL, Harlesden-road, London, N.W.10. Applications are invited for the following appointments to the Honorary Medical Staff:—

SECOND SURGEON to the Ear, Nose, and Throat Department. Candidates must be F.R.C.S. (England) and not engaged in general practice.

TEMPORARY HONORARY PHYSICIAN for a period of 18 months. Candidates must be M.D. and F. or M.R.C.P. (London) and not engaged in general practice.

Applications, with full particulars, including names of 3 referees, to be received by the undersigned not later than 9th October, 1946. J. N. DRAKE, Secretary.

LONDON LOCK HOSPITAL. Applications are invited from registered medical practitioners, Male, including R practitioners holding A posts, for the appointment of a second Full-time MEDICAL OFFICER (B2), to commence 1st November. The appointment will be for a period of 6 months, with salary at the rate of £350 p.a., non-resident.

Applications, stating age, qualifications with dates, nationality, experience, and full particulars, accompanied by copies (only) of 3 recent testimonials, must be in the hands of the undersigned not later than 7th October.

91, Dean-street, W.1. J. F. MORTON, Secretary.

PUTNEY HOSPITAL, Lower Common, S.W.15. The Board of Management invite applications for the appointment of a GENERAL SURGEON to the Honorary Surgical Staff. Candidates must be Fellows of the Royal College of Surgeons (England), and be engaged in consulting practice.

Applications for the appointment, supported by copies of testimonials, should be submitted by 31st October, 1946, to—

A. J. ELLICOTT, Secretary.

BRITISH POSTGRADUATE MEDICAL SCHOOL. (University OF LONDON.) Applications are invited from registered medical practitioners, Male and Female, for the following appointments:
HOUSE PHYSICIAN (A).
HOUSE SURGEON (A).
HOUSE SURGEON (A) (Obstetrics).
All posts vacant 1st November, 1946, and appointments are for 6 months. The salary for each post is at the rate of £105 p.a., plus full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.
Apply the Dean, British Postgraduate Medical School, Ducane-road, W.12, before 30th September, 1946.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. Applications are invited for the post of SURGEON to the Ophthalmic Department. Candidates are required to be Fellows of the Royal College of Surgeons of England.
Applications, giving details of previous experience, and accompanied by 3 testimonials of experience in ophthalmic work, should be forwarded not later than 30th September, 1946. Full details of the office can be obtained from the Secretary.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. Applications are invited for the post of ASSISTANT SURGEON. Candidates are required to be Fellows of the Royal College of Surgeons of England.
Applications, giving details of previous experience and accompanied by 3 testimonials, should be submitted not later than 31st October, 1946. Details of the office can be obtained from the Secretary.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. Applications are invited for the post of ASSISTANT PHYSICIAN. Candidates are required to be Fellows or Members of the Royal College of Physicians of London, and preference will be given to those having experience of neurology.
Applications, giving details of previous experience and accompanied by 3 testimonials, should be submitted not later than 31st October, 1946. Details of the office can be obtained from the Secretary.

NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W.1. Applications are invited for the position of HONORARY DENTAL SURGEON to the above Hospital. The L.D.S. qualification is required. Details of the office can be obtained from the Secretary.
Candidates should supply details of past experience and submit 3 testimonials from those under whom they have worked not later than 31st October, 1946.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich. The Committee of Management announce an immediate vacancy in the post of part-time non-resident MEDICAL REGISTRAR for a period of 12 months, renewable, at a salary of £350 p.a.
Applications from British male practitioners, stating age, qualifications, and previous experience, with copies of not more than 3 recent testimonials, to be sent on or before the 28th September to: F. A. LYON, Administrator and Secretary.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (B2), to become vacant 31st October. Salary is at the rate of £200 p.a., with full residential emoluments. R practitioners holding A posts may apply, when the appointment will be limited to 6 months.
Applications, stating age, qualifications with dates, and previous experience, accompanied by copies of recent testimonials, to be sent immediately to—
F. A. LYON, Administrator and Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN, Clapham Common, S.W.4. Applications are invited from registered medical Women practitioners, including those holding A posts, for the appointment of OBSTETRIC HOUSE SURGEON (B2). The appointment is for a period of 6 months from 1st November, 1946, with salary at the rate of £100 p.a., plus full residential emoluments.
Applications, stating age, nationality, qualifications with dates, and accompanied by copies of 3 recent testimonials, should be sent to the Secretary not later than 5th October, 1946.

MILLER GENERAL HOSPITAL, Greenwich High-road, S.E.10. Applications are invited from registered medical practitioners for the full-time appointment of MEDICAL OFFICER-IN-CHARGE of the Physiotherapy and Rehabilitation Departments. Salary will be according to qualifications, but not less than £650 p.a.
Applications, together with 3 testimonials, to be sent to the Secretary before 31st October, 1946.
23rd August, 1946.

MILLER GENERAL HOSPITAL, Greenwich High-road, S.E.10. Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A), duties to commence immediately. Salary is at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.
Applications, giving full particulars, together with copies of 3 recent testimonials, to be sent to the Secretary not later than 23rd September, 1946.
5th September, 1946.

MILLER GENERAL HOSPITAL, Greenwich High-road, S.E.10. Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), for a period of 1 year, to become vacant on 15th November, 1946. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £350 p.a., with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.
Form of application can be obtained from the Secretary.
9th September, 1946.

UNIVERSITY OF LONDON. St. Thomas's Hospital Medical SCHOOL. DEPARTMENT OF ANATOMY. Applications for the post of DEMONSTRATOR are invited at an initial salary of £350–£450, according to experience. Successful candidate will be required to contribute to superannuation under the F.S.S.U.
Applications (6 copies) should be lodged at the Dean's Office by 7th October.

LONDON COUNTY COUNCIL. Consultants and Specialists SERVICE. Applications are invited for temporary appointment as part-time consultant EAR, NOSE, AND THROAT SURGEON for duty in the first instance at Hackney Hospital, E.9, for 1 session a week and emergency visits as may be required. Salary £125 a year for one session a week and £2 12s. 6d. for each emergency visit, plus temporary cost-of-living addition in each case.
Application forms containing further particulars of conditions of service (stamped addressed foolscap envelope necessary) obtainable from the Medical Officer of Health (S.D.6), County Hall, S.E.1, returnable by 1st November, 1946. Canvassing disqualifies.

LONDON COUNTY COUNCIL. Consultants and Specialists SERVICE. Applications are invited for temporary appointment as full-time RADIODIAGNOSTICIAN for duty at Lambeth and St. James's Hospitals. Salary £1100–£50–£1300 a year, plus temporary cost-of-living addition. R practitioners holding B1 appointments should seek the approval of the Central Medical War Committee.
Application forms containing further particulars of conditions of service (stamped addressed foolscap envelope necessary), obtainable from the Medical Officer of Health (S.D.6), County Hall, S.E.1, returnable by 1st November, 1946. Canvassing disqualifies.

LONDON COUNTY COUNCIL. Mental Health Services. Applications are invited from registered medical practitioners for the appointment of SENIOR BIOCHEMIST at the Teaching and Research Laboratory in the Maudsley Hospital Postgraduate Medical School, Denmark Hill, S.E.5. The duties of the appointment are entirely research and teaching in biochemistry. Salary £1050, rising to £1250 a year, plus cost-of-living addition. Commencing salary according to experience.
Application forms, returnable by 14th October, 1946, from Medical Officer of Health (B), Mental Health Services, County Hall, Westminster Bridge, S.E.1. (2437.)

LONDON COUNTY COUNCIL. Consultants and Specialists SERVICE. Applications are invited for the following appointments:—
(1) Whole-time SURGEON SPECIALIST for orthopædic and traumatic surgery at St. Alfege's Hospital, Greenwich (part-time also at Lewisham Hospital and Queen Mary's Hospital, Sidcup).
(2) Whole-time SURGEON SPECIALIST for orthopædic work, for duty mainly at Queen Mary's Hospital, Carshalton, and St. James's Hospital, Balham.
Salary in each case £1400–£50–£1650 a year, plus temporary cost-of-living addition. There are no emoluments. Suitably qualified registered medical practitioners, including those serving in H.M. Forces, are invited to apply. R practitioners holding B1 appointments should seek the approval of the Central Medical War Committee.
Application forms (stamped addressed foolscap envelope necessary) obtainable from the Medical Officer of Health (S.D.6), County Hall, S.E.1, returnable by 1st November, 1946. Canvassing disqualifies.

BELGRAVE HOSPITAL FOR CHILDREN, 1, Clapham-road, S.W.9. The Committee of Management invite applications for the following appointments to the Honorary Medical Staff:—
PHYSICIAN. SURGEON. OPHTHALMIC SURGEON.
Candidates must be graduates in medicine of a British university. Physicians must be Fellows or Members of the Royal College of Physicians. Surgeons must be Fellows of the Royal College of Surgeons.
Applications must reach the undersigned by 18th October, 1946. Practitioners serving in H.M. Forces are invited to apply.
A. F. GRAY, Secretary.

CONNAUGHT HOSPITAL, London, E.17. The Board of Management invites applications for the post of HONORARY PHYSICIAN to the above Hospital. Candidates must be Fellows or Members of the Royal College of Physicians and preferably be on the staff of a London teaching hospital. Service candidates are invited to apply.
Applications should be submitted not later than 5th October, 1946, to: R. HALTON HARRISON, General Secretary.

ALBERT DOCK SEAMEN'S HOSPITAL, Alnwick-road, E.16. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (B2) now vacant. Salary is at the rate of £200 p.a., with full residential emoluments. Facilities include treatment of tropical diseases. R practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.
Applications, stating age, qualifications with dates, and previous experience, accompanied by copies of recent testimonials, to be sent immediately to—
F. A. LYON, Administrator and Secretary,
Seamen's Hospital Society.

ALBERT DOCK SEAMEN'S HOSPITAL, Alnwick-road, E.16. Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (B1) to become vacant 31st October. Salary is at the rate of £350 p.a., with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.
Applications, stating age, qualifications with dates, and previous experience, accompanied by copies of recent testimonials, to be sent immediately to—
F. A. LYON, Administrator and Secretary.
Seamen's Hospital Society, Greenwich, S.E.10.

THE NATIONAL HOSPITAL FOR NERVOUS DISEASES, Queen-square, London, W.C.1. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (B1). The appointment will be for a period of 6 months in the first instance. Salary is at the rate of £200 p.a., with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply. Demobilised members of H.M. Forces are invited to apply.

Applications, with copies of testimonials, to be sent not later than 30th September, 1946, to—

H. EWART MITCHELL, Secretary.

EMPIRE RHEUMATISM COUNCIL. Applications are invited from registered medical practitioners for the appointment of 2 REGISTRARS to assist the Council in a survey of rheumatoid arthritis. The appointments will be full time for 1 year in the first instance. One Registrar will work in London and the other in Bath. Experience in rheumatic diseases or a higher degree is desirable. Salary £450–£650 p.a., according to experience.

Applications, including full particulars, should be sent to: Secretary, Empire Rheumatism Council, Tavistock House (N), W.C.1, and should be in by 1st October, 1946.

HOSPITAL FOR TROPICAL DISEASES, 23, Devonshire-street, W.1. Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE OFFICER (B1), to become vacant 31st October. Salary is at the rate of £350 p.a., with full residential emoluments. R practitioners holding B2 posts, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Applications, stating age, qualifications with dates, and previous experience, accompanied by copies of recent testimonials, to be sent immediately to—

F. A. LYON, Administrator and Secretary.

Seamen's Hospital Society, Greenwich, S.E.10.

COUNTY BOROUGH OF WEST HAM. Central Home, Leytonstone, London, E.11. (800 Beds—Chronic Sick.) Applications are invited from registered medical practitioners (Male or Female) for the post of SECOND RESIDENT ASSISTANT MEDICAL OFFICER (B1). Salary for the post is at present £350 p.a., rising by annual increments of £25 to a maximum of £450 p.a., plus a temporary cost-of-living bonus, with apartments, board, and laundry, valued for superannuation purposes at £150 p.a., but the Council has under consideration the interim revision of the Askwith memorandum. The salary is inclusive, and all fees received, from whatever source, must be paid to the Council. Candidates must be fully qualified registered medical practitioners, and should have held a previous hospital appointment. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply. The person appointed must give his or her whole time to the service of the Council, and will be required, should the occasion arise, to act in any of the Council's other institutions. The appointment will be subject to the Council's regulations as made from time to time regarding service conditions, and the successful candidate will be required to pass a medical examination.

Application forms can be obtained from the Medical Officer of Health, 223/225, Romford-road, Forest Gate, London, E.7, on receipt of a stamped addressed envelope, and should be returned to him not later than 7th October, 1946. Canvassing members of the Council is prohibited and will disqualify.

E. E. KING, Town Clerk.

Town Hall, West Ham, E.15, 13th September, 1946.

THE MOTHERS' HOSPITAL of The Salvation Army, Clapton, E.5. Applications are invited from medical Women for the post of JUNIOR RESIDENT MEDICAL OFFICER (B2), vacant 14th October, 1946. Salary £110 p.a., with board, residence, and laundry. The appointment is for 6 months. Practitioners holding A posts may apply.

Applications to be sent before 5th October, 1946, to the Secretary.

MIDDLESEX COUNTY COUNCIL. House Physician (B2, resident), Chase Farm Hospital, Enfield, Middlesex, for general medical duties. Applications invited from registered medical practitioners, including R practitioners now holding A posts and liable under the National Service Acts. Salary £200 p.a., board, lodging, and laundry. Additional current bonus (now £60 p.a., proportion only paid in cash). Whole-time duties, such as Council may require, under supervision of Medical Director. 6 months' appointment. Post vacant 1st November, 1946.

Applications, stating age, qualifications, experience, enclosing copies of up to 3 recent testimonials, to Medical Director of Hospital. Application forms not provided. Closing date 5th October, 1946.

C. W. RADCLIFFE, Clerk of the County Council.

Guildhall, Westminster, S.W.1. (A. 351.)

COUNTY COUNCIL OF MIDDLESEX. West Middlesex County HOSPITAL, ISLEWORTH. Applications are invited for the additional non-resident whole-time appointment of ASSISTANT PATHOLOGIST. Candidates are expected to be medical Men or Women with experience in, and good general knowledge of, pathology but with leanings towards biochemistry. The general scope of duties, which may include teaching, will be arranged by the Medical Director. Appointment will be for 2 years in first instance, subject to medical examination and 1 month's notice. Salary £750 p.a., rising by annual increments of £50 to £950 p.a. Save in exceptional circumstances the appointment will not be extended beyond 5 years. Additional temporary bonus (now £60 p.a.). Unestablished and subject to medical examination. Salary is inclusive; any fees received to be paid to County Council.

Applications to the undersigned, stating age, nationality, qualifications, and experience, and enclosing copies of not more than 3 recent testimonials. Application forms not provided. Closing date 16th November, 1946.

C. W. RADCLIFFE, Clerk of the County Council.

Middlesex Guildhall, Westminster, S.W.1.

MIDDLESEX HOSPITAL. Applications are invited from duly qualified medical Men for the post of ACCIDENT OFFICER. The appointment will be for 1 year from 1st November. Salary £500, with an allowance of £100 for non-residence. The duties of the appointment will be to assist in the treatment of fractures and other injuries in the Orthopædic Department and to supervise the work of the Casualty Surgical Officers.

Applications, supported by copies of testimonials, should be sent to the Secretary-Superintendent, Middlesex Hospital, by 3rd October.

COUNTY COUNCIL OF MIDDLESEX. West Middlesex County HOSPITAL, ISLEWORTH. SENIOR MEDICAL APPOINTMENTS. Applications are invited for the following additional whole-time established appointments to the senior staff of the Hospital (approximately 1400 Beds):—

SURGEON (1 appointment).
PHYSICIANS (2 appointments).
OBSTETRICIANS (2 appointments).
PÆDIATRICIAN (1 appointment).

Candidates are expected to be Men or Women possessing a recognised higher qualification in their respective specialties. The general scope of duties, which may include teaching, will be arranged by the Medical Director. Salary £1200 (plus temporary bonus, now £60 p.a.) by £100 to £1800 p.a.; on proof of outstanding achievement further increments of £50 up to £2200 p.a. may be granted. In exceptional circumstances consideration will be given to appointing a candidate at a point above the minimum of the scale. Salary is inclusive; any fees received to be paid to County Council. Posts are non-resident but candidates appointed must live near Hospital. It is a condition of all senior medical appointments that a successful candidate undertakes to act as Deputy Medical Director for a period if called upon so to do. Appointments are pensionable, subject to medical examination and 3 months' notice.

Application to the undersigned, stating age, nationality, qualifications, and experience, and enclosing copies of not more than 3 recent testimonials. *Candidates should state for which post they are applying.* Application forms not provided. Closing date 16th November, 1946.

C. W. RADCLIFFE, Clerk of the County Council.

Middlesex Guildhall, Westminster, S.W.1.

ST. VINCENT'S ORTHOPÆDIC HOSPITAL, Northwood Hills, PINNER, MIDDLESEX. Applications are invited from registered medical practitioners for the appointments of (1) VISITING PHYSICIAN, (2) VISITING SURGEON (E.N.T.) at the above Hospital. Higher qualifications essential. There is an honorarium from the Staff Fund.

Applications should be addressed to the Secretary of the Medical Committee, and should be received not later than 1st November, 1946.

COUNTY BOROUGH OF CROYDON. Warlingham Park HOSPITAL (for Nervous and Mental Disorders), WARLINGHAM, SURREY. Applications are invited from registered medical practitioners, Male and Female, including R practitioners holding A posts, for the appointment of HOUSE PHYSICIAN (B2) for a period of 6 months. Opportunity for experience in all branches of psychiatry, including outpatient work with psychoses, psychoneuroses, delinquency, and child guidance. Salary at the rate of £300 p.a., with full residential emoluments, plus war bonus.

Apply to Medical Superintendent.

KENT AND SUSSEX HOSPITAL, Tunbridge Wells. Applications are invited from registered medical practitioners (Male or Female) for the post of HOUSE SURGEON AND CASUALTY OFFICER (B2), vacant 29th October, 1946. Salary at the rate of £200 p.a., with full residential emoluments. R practitioners who now hold A posts may apply, when appointment will be limited to 6 months; otherwise it may be for a period of 6 to 12 months. E. A. WAGSTAFF, Superintendent-Secretary.

COUNTY BOROUGH OF BOURNEMOUTH. Applications for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER are invited from duly qualified Men or Women. The duties are principally associated with maternity and child welfare, but include those in connexion with the school medical service, and such others as the Medical Officer of Health may direct. Preference will be given to candidates holding a Diploma in Public Health. The salary scale is at the rate of £650, increasing by annual increments of £25 to £850 p.a. In addition a war bonus and car allowance are payable, but superannuation contributions will be deducted from the salary.

Applications, stating age, qualifications, present and previous appointments (with dates and salaries), and experience, together with copies of 2 recent testimonials, should be forwarded to the Town Clerk, Town Hall, Bournemouth, so as to be received not later than 11th October. Canvassing, either directly or indirectly, will disqualify. A. LINDSAY CLEGG, Town Clerk.

Town Hall, Bournemouth, September, 1946.

LEEDS PUBLIC DISPENSARY AND HOSPITAL. Applications are invited from registered general practitioners for the following appointments, vacant 1st November:—

RESIDENT SURGICAL OFFICER (B1). Salary at the rate of £250 p.a., with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

HOUSE PHYSICIANS (A). Salary at the rate of £150 p.a., with full residential emoluments.

HOUSE SURGEONS (A) to the E.N.T. and Eye Department. Salary at the rate of £150 p.a., with full residential emoluments.

Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months.

Applications, stating age, nationality, experience, and qualifications, together with copies of recent testimonials, to be addressed to—

C. F. J. MAURY, Secretary and Superintendent.

THE GENERAL INFIRMARY AT LEEDS. Applications are invited from registered medical practitioners for the post of ASSISTANT MEDICAL OFFICER (B1) (Female) to the V.D. Department and ASSISTANT V.D. OFFICER to the City of Leeds. The appointment is a whole-time one and will be for a period of 1 year with eligibility for re-election. The commencing salary will be £700 p.a.

Applications, with copies of 3 recent testimonials, should be received by the undersigned not later than 14th October, 1946.

S. CLAYTON FRYERS, House Governor and Secretary.

CAMBRIDGESHIRE COUNTY COUNCIL. County Hospital. Applications are invited for the post of RESIDENT OBSTETRIC OFFICER (B2) at the above Hospital. The appointment is limited to 6 months. Salary is at the rate of £250 a year, with full residential emoluments. R practitioners holding A posts may apply.

Applications, with copies of recent testimonials, should be sent at once to the Clerk of the Cambridgeshire County Council, Shire Hall, Castle Hill, Cambridge.

13th September, 1946.

ROYAL DEVON AND EXETER HOSPITAL, Exeter. (350 Beds.) Applications are invited from registered medical practitioners for the post of ASSISTANT PATHOLOGIST (whole-time). Applicants should have had at least 3 years' experience in pathology. Salary will be paid at the rate of £1000 p.a., rising by annual increments of £100 to £1500.

Applications, together with not less than 3 recent testimonials, certificates of birth and registration, should be sent in not later than 26th October, 1946.

L. PARKHOUSE, Secretary and Manager.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited from Male registered practitioners for the post of HOUSE SURGEON (A), vacant 1st November, 1946. Salary will be at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, to be sent by 5th October, 1946, to—

JOHN WILLIAMS, House Governor and Secretary.

THE ROYAL WESTERN COUNTIES INSTITUTION, Starcross, DEVON. Applications are invited from duly qualified medical practitioners for the post of ASSISTANT MEDICAL OFFICER (B1). Salary £500, rising by annual increments of £50 to £650 p.a., plus £50 p.a. if holding the D.P.M. or on attaining such qualification. The Committee may adjust the initial salary within the scale according to the experience of the successful applicant. Full residential emoluments allowed in addition, which include furnished apartments. The successful candidate will be required to pass a medical examination. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply.

Further particulars of appointment may be obtained from the Medical Superintendent, to whom applications should be sent, accompanied by copies of 3 testimonials.

NATIONAL SANATORIUM, Benenden, Kent. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A). The vacancy is immediate and the salary at the rate of £200 a year, with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be limited to 6 months.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 testimonials, should be sent to the Secretary not later than 30th September, 1946.

LINCOLN COUNTY HOSPITAL. (Voluntary Hospital—200 Beds.) Applications are invited from registered medical practitioners, Male or Female, for the appointment of HOUSE PHYSICIAN (A), vacant middle of October, 1946. Salary is at the rate of £225 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when the appointment will be for 6 months. ARTHUR MOORE,

5th September, 1946. Secretary-Superintendent.

OXFORD COUNTY AND CITY MENTAL HOSPITAL, Littlemore, near OXFORD. TEMPORARY ASSISTANT MEDICAL OFFICER (B1) (Male) required immediately. Salary from £450 to £550, depending on previous experience which is not, however, essential, plus cost-of-living bonus. Extra £50 p.a. for D.P.M. Emoluments valued at £150 p.a. are additional, and consist of board, lodging, and laundry. Appointment subject to the requirements of the Central Medical War Committee. R practitioners holding B2 posts, also those holding B1 and ineligible for H.M. Forces, may apply.

Apply forthwith to Medical Superintendent, giving full particulars.

THE OXFORD EYE HOSPITAL, Walton-street, Oxford. Applications are invited from registered medical practitioners for the post of Full-time NON-RESIDENT CLINICAL ASSISTANT. Candidates are required to hold either the Diploma in Ophthalmology of the University of Oxford or the Diploma in Ophthalmic Medicine and Surgery. Remuneration will be on a sessional basis according to experience, but will not be less than £500 p.a.

Applications, stating age, qualifications, and experience, and accompanied by copies of 3 recent testimonials, should be sent forthwith to: C. F. SHARE, Secretary.

ROYAL LANCASTER INFIRMARY, Lancaster. (286 Beds.) (Hospital recognised by the Royal College of Surgeons for 2 Senior posts.) Applications are invited from registered medical practitioners, Male and Female, for the post of HOUSE PHYSICIAN (A), vacant 30th September, 1946. Salary £170 p.a. The appointment will be limited to six months. Full residential emoluments are included. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications should be sent to—

C. H. GRIMSHAW, Superintendent-Secretary.

ROYAL NORTHERN INFIRMARY, Inverness. Assistant PATHOLOGIST wanted. The work will include bacteriology, clinical pathology, and post-mortem examinations, and the Assistant Pathologist will also act as Assistant Medical Officer to the Blood Transfusion Service. Salary in respect to both appointments £700 p.a. Applications to be addressed to Medical Superintendent, Royal Northern Infirmary, Inverness.

DEPARTMENT OF HEALTH FOR SCOTLAND. Applications are invited by the Department of Health for Scotland for appointment as REGIONAL MEDICAL OFFICER. The scale of salary (for men or women) is £1110–£30–£1250–£50–£1450 (Edinburgh and Glasgow). The minimum of £1110 is linked to age 38, with deductions below that age of £30 p.a., and additions of £30 p.a. up to age 40. Outside Edinburgh and Glasgow the scale of salary will be slightly less. The appointment will be subject to the usual Civil Service conditions as to pension, holidays, &c. If the successful applicant is a pensionable official of a local authority, the Local Government and Civil Service (Superannuation) Rules, 1936, will apply. Candidates must be medical practitioners of standing in the profession, with experience in hospital and general practice, and must be not more than 45 years of age on 1st September, 1946. Consideration will be given to higher qualifications and to extra diplomas in special branches of medicine. The officer appointed will be required to devote his full time to the public service, and to live at such headquarters in Scotland as may from time to time be determined by the Department.

Forms of application with further particulars of the appointment may be obtained from the Establishment Officer (Room 31), Department of Health for Scotland, St. Andrew's House, Edinburgh, 1. No application will be considered unless received on the prescribed form not later than 31st October, 1946.

23rd August, 1946.

BRACEBRIDGE HEATH HOSPITAL, near Lincoln. The Committee of Visitors invite applications for the whole-time appointments of 2 ASSISTANT MEDICAL OFFICERS (B1). The salary and emoluments will be in accordance with the scale laid down by the Askwith memorandum, viz., commencing salary £455 p.a., rising by annual increments of £25 to £555 p.a., plus emoluments as follows—Married: unfurnished flat, rates, fuel, light, water, vegetables, laundry, and cleaning materials, valued for superannuation purposes at £75 p.a. Single: board, apartments, attendance, and laundry, valued for superannuation purposes at £125 p.a. There is accommodation for 1 married man only. The successful candidates will be required to pass satisfactorily a medical examination and to join the scheme under the Asylum Officers' Superannuation Act, 1909. The appointments will be subject to 1 month's notice on either side. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply.

Applications, together with a copy of 1 recent testimonial and the names of 2 persons to whom reference may be made, should be addressed to the Medical Superintendent not later than 31st October, 1946.

BOROUGH OF OLDBURY. The Council invite applications from registered medical practitioners of either sex for the appointment of ASSISTANT MEDICAL OFFICER. Possession of M.R.C.O.G., D.C.H., or D.P.H. will be an additional qualification, and preference will be given to those who have held a residential appointment at a maternity hospital with an antenatal clinic. The officer will be required to devote whole-time to duties to be performed under the direction of the Medical Officer of Health consisting chiefly of school medical and maternity and child welfare work, with opportunity to take part in the general administration of the Public Health Department. The salary will be fixed according to qualifications and experience within the revised scale (£650 p.a., rising to £850 p.a.), plus £30 travelling allowance. The current war bonus (£59 16s. p.a.) will also be paid.

Application forms, with further particulars of the appointment, may be obtained from the undersigned, and should be returned, with copies of 3 recent testimonials, not later than 7th October, 1946, endorsed "Assistant Medical Officer."

ARTHUR CULWICK, Town Clerk.

Municipal Buildings, Oldbury, 14th September, 1946.

CITY OF LEEDS. Public Health Department. St. Mary's Infirmary. Applications are invited from registered medical practitioners for the post of JUNIOR RESIDENT MEDICAL OFFICER (B2), vacant 1st November, 1946. Applicants must have had previous experience in either medical or surgical wards. The salary is at the rate of £250 p.a., plus a cost-of-living bonus at present £29 18s., together with full residential emoluments. The hospital comprises a Maternity Unit of 98 Beds and 102 Beds for chronic sick. It is a Part I Training School under the regulations of the C.M.B., and the duties of the officer will include instruction of pupil midwives and such other duties as may be required by the Medical Superintendent. All fees received by the officer must be paid into the City Funds. R practitioners holding A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications, &c., together with copies of 3 recent testimonials and endorsed "R.M.O.—St. Mary's Infirmary," to be forwarded as soon as possible to—

J. JOHNSTONE JERVIS, Medical Officer of Health,

Public Health Department (Hospitals Administration Section), 12, Market Buildings, Vicar-lane, Leeds, 1.

PAPWORTH VILLAGE SETTLEMENT. Applications are invited for the appointment of VISITING CHEST PHYSICIAN to the Settlement. Applicants, of whom 2 will be appointed, must be Fellows or Members of the Royal College of Physicians, and hold an appointment as Visiting Physician to a recognised Chest Hospital. The successful candidates will be required to visit the Settlement twice monthly and work under the supervision of the Medical Director. The appointments will be for 1 year in the first place, at a salary of £250 p.a., plus travelling expenses.

Applications should reach the Medical Director, Papworth Village Settlement, Cambridge, not later than 1st November.

CANWELL BABIES' HOSPITAL, Sutton Coldfield. (60 Cots.) Applications are invited for the appointment of Woman HOUSE PHYSICIAN (B2) at the above Hospital at a salary of £250 p.a., plus full residential emoluments. The appointment will be for a period of 3 months from 1st November, 1946.

Forms of application may be obtained from the Medical Officer of Health, the Council House, Birmingham, 3, and should be returned, together with 3 testimonials, not later than 25th September, 1946.

SURREY COUNTY COUNCIL. St. Helier County Hospital, CARSHALTON. (862 Beds.) Applications, including those from suitably qualified practitioners serving with H.M. Forces, are invited for the following appointments:—

(*a*) OBSTETRICIAN AND GYNÆCOLOGIST. Candidates must have wide and varied obstetrical and gynæcological experience. They must hold the M.R.C.O.G. or F.R.C.O.G. and should preferably hold a higher surgical qualification. The appointment is full-time and the person appointed will be in clinical charge of the modern maternity unit of approximately 107 Beds and in addition 30 gynæcological beds and antenatal, postnatal, and consultative outpatients' clinics. The commencing salary will be according to qualifications and experience on the scale £1500–£100–£1800 p.a. inclusive. The holder of this appointment will be required to live within reasonable distance of the Hospital.

(*b*) RADIOLOGIST. Candidates must hold the D.M.R.E. and a higher medical qualification and have had wide experience of radiology. Commencing salary will be according to qualifications and experience on the scale £1500–£100–£1800 p.a., inclusive. The person appointed will be required to live within reasonable distance of the Hospital.

(*c*) PÆDIATRICIAN (part-time). Candidates must possess a higher medical qualification and have had wide and varied experience of paediatrics. The children's unit comprises 120 Beds (of which up to 36 may be allotted as surgical beds under the general surgeons). The salary will be at the rate of £900 p.a., inclusive, for approximately 18 hours' work per week. Preference will be given to candidates who hold appointments in London teaching and/or specialist hospitals.

Appointments (*a*) and (*b*) will be subject to the Local Government Officers' Superannuation Act, 1937. Information concerning the nature of the appointments may be obtained from the Medical Superintendent of the Hospital.

Applications by letter, stating age, qualifications, and experience, with a copy of not more than 3 recent testimonials and/or the names of 3 referees, should reach the County Medical Officer, County Hall, Kingston-on-Thames, not later than 21st November, 1946.

SURREY COUNTY COUNCIL. St. Helier County Hospital, CARSHALTON. (862 Beds.) Applications, including those from suitably qualified practitioners serving with H.M. Forces, are invited for the appointment of REGISTRAR (B1) for the Department of Physical Medicine. Candidates must have had experience in house appointments and should preferably possess a higher medical qualification and/or the Diploma in Physical Medicine. The commencing salary will be according to qualifications and experience on the scale £550–£50–£700 p.a., inclusive, plus payment in cash at the rate of £150 p.a. in lieu of residential emoluments. The tenure of the appointment is limited to a maximum of 4 years but the post is subject to the Local Government Superannuation Act, 1937. Suitably qualified R practitioners holding B2 appointments may apply, but applications from R practitioners now holding B1 appointments cannot be considered unless they are ineligible for service with H.M. Forces.

Information concerning the nature of the appointment may be obtained from the Medical Superintendent of the Hospital, to whom applications by letter, stating age, qualifications, and experience, with a copy of not more than 3 recent testimonials and/or the names of 3 referees, should be sent to reach him not later than 21st November, 1946.

BERKSHIRE COUNTY COUNCIL. Old Windsor Emergency HOSPITAL. HOUSE OFFICER (A) required for Emergency Wards. Applicants should be fully qualified registered medical practitioners. Salary £100 p.a., plus board and lodging. Details of duties, &c., may be obtained from Medical Superintendent, Emergency Hospital. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be limited to 6 months.

Applications, giving full details of qualifications and experience, together with copies of 3 testimonials, to be forwarded to the County Public Assistance Officer, 3, Abbot's Walk, Reading.

BIRMINGHAM UNITED HOSPITAL. The General Hospital, THE QUEEN ELIZABETH HOSPITAL. (Also incorporating the QUEEN'S HOSPITAL, 1840–1941.) Applications are invited from registered medical practitioners for the following posts:—

RESIDENT ANÆSTHETIST (B2). Salary £100 to £120 p.a., according to experience, with full residential emoluments. The appointment is for the period 15th October, 1946, to 30th April, 1947, and is a recognised post for the purpose of taking the Diploma in Anæsthetics. Candidates from the Forces will be specially considered. R and W practitioners holding A posts may apply.

HOUSE SURGEON (A) to the Ear, Nose, and Throat Department. The appointment is for 6 months from 1st November. Salary £70 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications, experience, nationality, and present post, together with copies of 3 recent testimonials, should be sent at once to—

G. HURFORD, Secretary, Birmingham United Hospital.

The Queen Elizabeth Hospital, Birmingham, 15.

SUSSEX THROAT AND EAR HOSPITAL, Brighton. The Committee of Management invite applications for the appointment of HONORARY GENERAL SURGEON.

Applications should be sent not later than 21st October to the Secretary.

GLASGOW ROYAL INFIRMARY. Department of Radiology. The Managers invite applications from registered medical practitioners for the post of DIRECTOR of Radiological Department. The salary will be £1750 p.a., plus percentage of private patients' fees. The post is superannuable. The appointment is subject to annual reappointment. Particulars as to duties, &c., may be obtained from the Superintendent, Glasgow Royal Infirmary, 84, Castle-street, Glasgow, C.4.

Applications, stating age, with 3 names for reference, to be lodged with the undersigned not later than 31st October, 1946. No canvassing. A. A. MACIVER, C.A., F.H.A., Secretary.

Glasgow Royal Infirmary,
Office: 135, Buchanan-street, Glasgow, C.1.

GLASGOW ROYAL INFIRMARY. The Managers invite applications from registered medical practitioners for the post of ANÆSTHETIST to the Infirmary (3 vacancies). Salary will be £450 p.a. The appointment is subject to annual reappointment. Particulars as to duties, &c., may be obtained from the Superintendent, Glasgow Royal Infirmary, 84, Castle-street, Glasgow, C.4.

Applications, stating age, with 3 names for reference, to be lodged with the undersigned not later than 31st October, 1946. No canvassing A. A. MACIVER, C.A., F.H.A., Secretary.

Glasgow Royal Infirmary,
Office: 135, Buchanan-street, Glasgow, C.1.

BERKS AND BUCKS JOINT SANATORIUM, Peppard Common, HENLEY-ON-THAMES, OXON. Applications are invited from suitably qualified medical practitioners for the post of DEPUTY MEDICAL SUPERINTENDENT (B1), within the salary scale of £675, rising by annual increments of £25 to £775 p.a., together with a cost-of-living bonus and emoluments. If married quarters are required the emoluments will be assessed at £120, otherwise single accommodation with full board-residence is provided and assessed at £150 p.a. The appointment will be subject to 1 calendar month's notice on either side and to the provisions of the Local Government Superannuation Act, 1937. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Applications, stating age, qualifications, and experience, with copies of 3 testimonials and/or the names of 3 referees, should reach the Medical Superintendent not later than 19th October, 1946.

COUNTY COUNCIL OF DURHAM. Applications are invited from registered medical practitioners (Female) for the post of ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICER at a commencing salary of £650 p.a., rising by annual increments of £25 to £850 p.a., plus cost-of-living bonus. Travelling expenses will be paid in accordance with a scale approved by the County Council from time to time. The appointment is subject to the regulations for the time being of the County Council relative to the payment of salary in the case of sickness, and will be terminable by 3 calendar months' notice on either side.

The appointment is also subject to certain conditions, particulars of which may be obtained from the County Medical Officer of Health, Shire Hall, Durham, to whom applications, with copies of not more than 3 recent testimonials, should be addressed not later than 7th October, 1946.

J. K. HOPE, Clerk of the County Council.

Shire Hall, Durham, 12th September, 1946.

ROCHDALE INFIRMARY, Lancs. (110 Beds.) The Board of Management invite applications from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), including Specials House Surgeon. Salary is at the rate of £200 p.a., with full residential emoluments. The successful candidate must be a member of a Medical Defence Society. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications to: W. WYNNE, Superintendent-Secretary.

THE ROYAL LIVERPOOL CHILDREN'S HOSPITAL, Myrtle-street, LIVERPOOL, 7. The Committee invite applications for the appointment of MEDICAL REGISTRAR AND CLINICAL TUTOR (B1), non-resident, part-time. The appointment will be for a period of 1 year from 1st October, 1946. Salary at the rate of £200 p.a. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Further particulars may be obtained from the Secretary of the Hospital, to whom applications should be sent by an early post.

THE COPPICE, Nottingham. (Registered Mental Hospital—104 Beds.) ASSISTANT MEDICAL OFFICER required. Quarters are available only for a single man. Previous experience of psychiatry essential. Salary at the rate of £525 p.a., with full residential emoluments.

THE BOLTON ROYAL INFIRMARY. (288 Beds—Resident Medical Staff, 6.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (B2), vacant 1st November, 1946. Salary £200 p.a., with full residential emoluments. R practitioners holding A posts may apply, when the appointment will be limited to 6 months.

Applications, stating age, nationality, and experience, together with copies of testimonials, to be forwarded to—

JOSEPH GRIFFITH, Superintendent-Secretary.

STAMFORD, RUTLAND AND GENERAL INFIRMARY. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), vacant 12th October, 1946. Salary is at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of 3 recent testimonials, should be sent immediately to the Secretary, H. F. DONALD, The Infirmary, Stamford.

WORKINGTON INFIRMARY. (Capacity 60 Beds.) Applications are invited for the appointment of HOUSE SURGEON (B2), Male, vacant now. Salary is at the rate of £200 p.a., with full residential emoluments. R practitioners holding A posts may apply, when the appointment will be limited to 6 months.

Applications should be sent immediately to—

DR. T. T. GRAHAM, Honorary Medical Secretary.

SWANSEA GENERAL AND EYE HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER (B2), now vacant. The salary is at the rate of £192 10s. p.a., with full residential emoluments. R practitioners holding A posts may apply, when the appointment will be limited to 6 months.

O. C. HOWELLS, Secretary-Superintendent.

CITY OF MANCHESTER. Public Health Department. Applications are invited from registered medical practitioners, including those serving with H.M. Forces, for the appointment of VISITING PSYCHIATRIST to undertake consultant psychiatric work in connexion with patients in Crumpsall Hospital (adult, general—1400 Beds) and the adjoining institution of Park House (1999 Beds, including 670 Beds for mental patients). Candidates should hold the D.P.M. Basic annual salary £600 in respect of 4 sessions weekly, each of 2 hours' duration, including an outpatient clinic once weekly. The appointment is part-time and does not carry with it the right of entry into the Corporation superannuation fund. A temporary cost-of-living wages award is payable in addition to the salary quoted.

Applications, stating fully the age, qualifications with dates, experience, details of appointments held now, and the names of 3 persons to whom reference can be made, are to be addressed to the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester, 2, on or before 5th October, 1946. Canvassing in any form, oral or written, direct or indirect, is prohibited.

PHILIP B. DINGLE, Town Clerk.

Town Hall, Manchester, 2, 9th September, 1946.

CITY OF MANCHESTER. Monsall Hospital for Infectious Diseases. (600 Beds.) Applications are invited from medical practitioners, including those in H.M. Forces, for the following appointments which will become vacant on 1st October, 1946 :—

(*a*) RESIDENT SECOND ASSISTANT MEDICAL OFFICER (B1).

(*b*) RESIDENT ASSISTANT MEDICAL OFFICER (B1) for puerperal fever wards.

Preference will be given to applicants who have held resident surgical and medical posts in a general hospital, and have special experience in bacteriology. Basic annual salary £350, rising by annual increments of £25 to a maximum of £450 p.a., with board, residence, and laundry in addition valued at £85 p.a., subject to the Manchester Corporation conditions of service. A temporary cost-of-living wages addition is payable in addition to the basic salary. The application of the revised interim Askwith scales is at present under consideration, and the salary scales applicable to these posts will be reviewed in the event of the Corporation adopting the revised Askwith scales. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box No. 399, Town Hall, Manchester, 2, and applications must be received by him not later than 28th September, 1946. Canvassing in any form, oral or written, direct or indirect, is prohibited. PHILIP B. DINGLE, Town Clerk.

Town Hall, Manchester, 2, 2nd September, 1946.

CITY OF MANCHESTER. Crumpsall Hospital. (1400 Beds.) The Public Health Committee invites applications from registered practitioners, Male or Female, for the following appointments, which will become vacant at Crumpsall Hospital in October, 1946 :—

(1) RESIDENT HOUSE OFFICER (B2). The duties of the post are mainly medical. The basic salary is £250 p.a., with board, residence, and laundry in addition. Practitioners serving in H.M. Forces are invited to apply. R practitioners holding A posts may apply when the appointment will be for a period of 6 months; otherwise 12 months.

(2) 2 RESIDENT HOUSE OFFICERS (A). The duties of one post are mainly medical and of the other mainly surgical. The basic salary in each case is £200 p.a., with board, residence, and laundry in addition. (Please indicate in the application whether the medical or surgical post is sought.) Practitioners within 3 months of qualification and liable under the National Service Acts may apply when each appointment will be for a period of 6 months; otherwise 12 months.

The appointments are subject to the Manchester Corporation conditions of service. A temporary cost-of-living wages addition is also payable in addition to the salaries stated.

Applications, stating the full name, age (giving date of birth), nationality, professional qualifications with dates, particulars of present appointment and past hospital appointments, are to be addressed to the Medical Superintendent, Crumpsall Hospital, Crumpsall, Manchester, 8, and must be received by him not later than 5th October, 1946. Canvassing in any form, oral or written, direct or indirect, is prohibited.

PHILIP B. DINGLE, Town Clerk.

Town Hall, Manchester, 2, 6th September, 1946.

MANCHESTER HOSPITAL FOR CONSUMPTION AND DISEASES OF THE THROAT AND CHEST. Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT HOUSE SURGEON (B2) at the St. Anne's Hospital, Bowdon, Cheshire. The Hospital has 50 Beds and the work is mainly ear, nose, and throat. Salary £200 p.a., with full residential emoluments. R practitioners holding A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications, and nationality, and accompanied by copies of 3 recent testimonials, should be sent before 4th October to W. HUNT, Secretary, Manchester Hospital for Consumption and Diseases of the Throat and Chest, 45, Hardman-street, Manchester, 3.

THE UNIVERSITY OF MANCHESTER. Department of Bacteriology and Preventive Medicine. Applications are invited for the post of LECTURER IN BACTERIOLOGY. Candidates should possess a registrable medical qualification and should have had appropriate experience in bacteriology. Duties to commence as soon as possible. Salary £750—£1000 p.a., according to qualifications and experience.

Applications should be sent not later than 9th November, 1946, to the Registrar, the University, Manchester, 13, from whom further particulars may be obtained.

THE UNIVERSITY OF MANCHESTER. Nuffield Department of Industrial Health. Applications are invited for the post of LECTURER IN INDUSTRIAL HEALTH. Previous experience of Industrial Medicine is not a necessary requirement but applicants should have had research experience in medicine or one of the medical sciences, and must hold a registrable medical qualification. Duties to commence as early as possible. Salary £1000 p.a.

Applications should be sent not later than 1st December to the Registrar, The University, Manchester, 13, from whom further particulars may be obtained.

MANCHESTER ROYAL INFIRMARY. The Board of Management of the Manchester Royal Infirmary invite applications for the appointment of 2 HOUSE SURGEONS (A) to Orthopædic Department, vacant on 13th and 30th November, 1946, from registered medical practitioners, Male and Female, including R practitioners within 3 months of qualification and liable under the National Service Acts. The appointments are for 6 months, subject to the provisions of the bylaws as to notice, &c. Salary at the rate of £75 p.a., with the usual residential emoluments.

Applications, stating nationality, age, and qualifications, to be sent to the Chairman of the Medical Board not later than 16th October, 1946. By Order,

F. J. CABLE, General Superintendent and Secretary.

4th September, 1946.

MANCHESTER ROYAL INFIRMARY. The Board of Management invite applications for the appointment of an HONORARY ASSISTANT AURAL SURGEON. Candidates must hold one of the recognised higher degrees of a university of the British Commonwealth or a higher diploma of one of the Royal Colleges of the United Kingdom. Candidates are required to forward the names of not more than 4 referees to whom the Selection Committee may refer.

Applications, which must be delivered to the General Superintendent on or before 9th November, 1946, should be accompanied by the candidate's certificate of age. 40 copies of such applications are required for distribution to the Selection Committee prior to the meeting. Canvassing, directly or indirectly, is forbidden, and the Committee reserve to themselves the right, on proceeding to election, to take into consideration any complaint that canvassing on behalf of any candidate has taken place. By Order,

F. J. CABLE, General Superintendent and Secretary.

Manchester Royal Infirmary, 27th August, 1946.

MINISTRY OF PENSIONS. Stoke Mandeville Hospital, Aylesbury. Applications are invited from registered medical practitioners for the appointment of PHYSICIAN (Senior) for duties in connexion with the Head and Spinal Injuries Centre at the above-mentioned Hospital. Candidates must have appropriate neurological experience. Salary £800 p.a., with consolidation addition of £92 p.a. and free board and lodging or an allowance of £100 p.a. in lieu thereof if permission is given to live out. Suitably qualified R practitioners holding B1 posts and ineligible for H.M. Forces are invited to apply.

Applications are also invited from registered medical practitioners (Men and Women) for the appointment of HOUSE SURGEON (B1) for duties in connexion with the Head and Spinal Injuries Centre at the above-mentioned Hospital. Applicants should have held house appointments. Salary £350 to £550 p.a., according to experience, with appropriate consolidation addition and free board and lodging or an allowance of £100 p.a. in lieu thereof if permission is given to live out. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Applications are also invited from registered medical practitioners (Men and Women), including R practitioners who already hold A posts, for appointment as HOUSE SURGEONS (B2) at Childwall Hospital, Liverpool, and Stoke Mandeville Hospital, Aylesbury, Bucks. The appointments offer opportunities for experience in general and orthopædic surgery. Salary £300 p.a., plus consolidation addition and free board and lodging or an allowance of £100 p.a. if permission is given to live out. If held by an R practitioner the appointment will be limited to 6 months.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of 2 recent testimonials, should be addressed to the Secretary, Ministry of Pensions, Medical Services Division, Norcross, Blackpool, Lancs.

COUNTY BOROUGH OF DONCASTER. Applications are invited for the post of ASSISTANT MEDICAL OFFICER OF HEALTH (Female) at a salary of £650 p.a., rising, subject to satisfactory service, by annual increments of £25 to a maximum of £850 p.a., together with the current cost-of-living bonus. The duties will be mainly concerned with maternity and child welfare and school medical work. The person appointed will be required to devote the whole of her time to the duties of the office and to act under the direction of the Medical Officer of Health. The appointment is subject to 3 months' notice on either side, to the passing of a medical examination, and to the provisions of the Local Government Superannuation Act, 1937.

Applications, stating age, qualifications, and full details of experience, together with copies of up to 3 testimonials, should be sent to the Medical Officer of Health, Health Department, Wood-street, Doncaster, to reach him not later than 7th October. H. S. ESSENHIGH, Town Clerk.

1, Priory-place, Doncaster, 7th September, 1946.

UNIVERSITY OF ST. ANDREWS. The University Court invites applications for the post of LECTURER in the Department of Bacteriology in the Medical School, Dundee. Salary £400 p.a., with superannuation provision and an additional payment of £50 p.a. for special duties. Applications will be considered from candidates in H.M. Forces.

Applications, with copies of 2 recent testimonials and the names of 2 referees, to be submitted to the undersigned, from whom a statement of conditions of appointment may be obtained. Closing date 16th November, 1946.

DAVID J. B. RITCHIE, Secretary.

The University, St. Andrews.

UNIVERSITY OF ST. ANDREWS. The University Court invites applications for the post of LECTURER in the Department of Pathology in the Medical School, Dundee. Commencing salary according to experience £450–£600, with superannuation provision, and a supplementary payment of £100 p.a. in respect of special duties. Applications will be considered from candidates in H.M. Forces. Applicants whose main interest is chemical pathology will be preferred.

Applications, with 2 recent testimonials and the names of 2 referees, should be lodged with the undersigned, from whom a statement of conditions of appointment may be obtained. Closing date 16th November, 1946.

DAVID J. B. RITCHIE, Secretary.

The University, St. Andrews.

COUNTY MENTAL HOSPITAL, Lancaster. Applications are invited from registered medical practitioners for the post of FIRST ASSISTANT MEDICAL OFFICER (B1). Applicants must have the D.P.M. or an equivalent qualification and considerable experience in psychiatric practice. Salary £870 p.a. (including £50 p.a. for the D.P.M.), plus war bonus of £59 16s. p.a. (male) or £48 2s. p.a. (female). An unfurnished house is provided for a married person which is valued as an emolument at £60 p.a.

Applications, stating age, qualifications, and experience, accompanied by the names of 2 referees, to be sent to the Medical Superintendent not later than 25th October, 1946.

COUNTY BOROUGH OF NEWPORT. Social Welfare Committee. Applications are invited from suitably qualified persons, having considerable hospital experience, for a TEMPORARY DEPUTY MEDICAL OFFICER (B1), resident, at Wooloston House Emergency Hospital, Newport (631 Beds), which is a recognised training school for nurses and provides treatment for acute medical and surgical cases, tuberculosis, obstetrics, and children's diseases, &c. Preference will be given to applicants experienced in obstetrics, gynæcology, and surgery. The temporary appointment has occurred owing to the calling up of the present Deputy Medical Officer for service in a medical branch of one of the Forces. Salary £650 p.a., rising by annual increments of £50 to £750 p.a., plus cost-of-living bonus, at present £30 p.a. All fees, with the exception of coroner's fees, are payable to the Social Welfare Committee. A sum of £125 p.a. will be deducted from salary for value of residential emoluments. Suitably qualified R practitioners holding B2 appointments, those holding B1 and ineligible for H.M. Forces, and members of H.M. Forces due for discharge are invited to apply. The appointment is terminable by 1 month's notice on either side.

Applications, stating age, qualifications, and experience, accompanied by copies of 3 recent testimonials, to be sent to the Director of Social Welfare, Town Hall, Newport, as soon as possible.

T. MERVYN JONES,
Town Clerk and Clerk to the Social Welfare Committee.

Town Hall, Newport, Mon. 11th September, 1946.

ROFFEY PARK REHABILITATION CENTRE, Horsham, SUSSEX. (120 Beds for the treatment of industrial neuroses.) There is a vacancy for the post of Half-time PSYCHIATRIST at this Centre. Experience of physical methods advantageous. Salary £500 p.a., plus living accommodation.

Applications, stating age, experience, and qualifications, should be sent forthwith to the Medical Director.

10th September, 1946.

COUNTY BOROUGH OF READING. The Council of the County Borough of Reading invite applications from registered medical practitioners of not less than 3 years' experience of their profession for the post of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH AND TEMPORARY ASSISTANT SCHOOL MEDICAL OFFICER. The holding of a Diploma in Public Health and recognition by the Ministry of Education for the assessment of children in need of special educational treatment will be an advantage. The duties will be principally connected with the work of school medical inspection and the Council's maternity and child welfare scheme, and the successful candidate will be required to carry out such other general duties as may from time to time be assigned by the Medical Officer of Health, who is also the School Medical Officer. The successful candidate will be required to devote his or her whole time to the duties of the post. Private practice will not be permitted. The salary payable will be at the rate of £650 p.a., rising by annual increments of £25 to a maximum of £850 p.a., together with the current cost-of-living bonus. In accordance with the present practice of the Corporation, the post is a temporary one, but in making the appointment the desirability of appointing the person appointed to a permanent post in due course, if found suitable, will be considered. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate must pass a medical examination. The appointment will also be terminable by 1 month's notice on either side, and in the case of a woman by her marriage, unless the Council decide otherwise.

Applications must be made on forms to be obtained from the undersigned, be accompanied by copies of not more than 3 recent testimonials, and must be endorsed "Assistant Medical Officer of Health and Assistant School Medical Officer" and be delivered to the undersigned not later than Saturday, 12th October, 1946. Canvassing, either directly or indirectly, will be a disqualification.

G. F. DARLOW, Town Clerk.

Town Hall, Reading, 21st September, 1946.

GENERAL HOSPITAL, Nottingham. (Main Hospital, 550 Beds, including E.M.S. Beds; Cedars Branch, 115 Beds.) Full-time RESIDENT ORTHOPÆDIC REGISTRAR required for Accident and Orthopædic Service. Salary £500 p.a. Duties will be chiefly in the Accident Reception Room, but will also include ward and theatre experience. Previous experience essential. Good opportunity for man wishing further experience in this type of work. Preference will be given to applicants with Fellowship qualification.

Applications, to be received not later than 17th September, 1946, to be sent to—

HENRY M. STANLEY, House Governor and Secretary.

GENERAL HOSPITAL, Nottingham. (664 Beds, including E.M.S. Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ANÆSTHETIST (B1). The salary is at the rate of £300 p.a., with full residential emoluments, and duties will commence as soon as possible. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply.

Applications should be sent to—

HENRY M. STANLEY, House Governor and Secretary.

NORTH RIDING COUNTY COUNCIL. Applications are invited from suitably qualified registered medical practitioners, including those now serving in H.M. Forces, for the whole-time appointment of TUBERCULOSIS OFFICER at a salary in accordance with the interim revision of the Askwith scale, commencing at £960 and rising by biennial increments of £50 to £1160, plus cost-of-living bonus (at present £59 16s.). Candidates must possess special knowledge and have recent experience of tuberculosis work, including interpretation of X-ray films. Travelling and subsistence allowances will be paid in accordance with the County Council's scale. The appointment will be determinable by 3 months' notice in writing on either side and is subject to the provisions of the Local Government Superannuation Act, 1937.

Applications, stating qualifications and experience, together with 1 testimonial and the names of 2 persons to whom reference may be made, should be forwarded not later than Saturday, 19th October, 1946, to—

H. G. THORNLEY, Clerk of the County Council.

County Hall, Northallerton, September, 1946.

HULL ROYAL INFIRMARY. Applications are invited for the following posts:—

RESIDENT SURGICAL OFFICER (B1), vacant 1st October. Preference will be given to candidates holding the diploma of F.R.C.S. Salary £300 p.a. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply.

FIRST HOUSE SURGEON (B2) and HOUSE SURGEON (B2) to Eye and E.N.T. Departments (2 posts), vacant October. Salary £200 p.a. Suitably qualified R practitioners holding A posts may apply.

CASUALTY OFFICERS (A) (2 posts), vacant October. Salary £200 p.a. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

All the above posts carry full residential emoluments, and will be for 6 months in the first instance but are determinable by 1 month's notice on either side.

Applications to: R. J. CARLESS, House Governor.

LANCASHIRE COUNTY COUNCIL. Public Health Committee. COUNTY HOSPITAL, WHISTON, near PRESCOT. Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1). Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. The Hospital is a general hospital dealing with acute work, and comprises 650 Beds. The appointment is subject to medical examination and is superannuable. Salary is at the rate of £400 p.a., together with the usual residential emoluments. The person appointed will be required to take up duty as early as possible. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Forms of application may be obtained from the County Medical Officer of Health, Hospital and Medical Department, County Offices, Preston, to whom all applications must be returned not later than Friday, 11th October, 1946.

R. H. ADCOCK, Clerk of the County Council.

County Offices, Preston, 12th September, 1946.

LANCASHIRE COUNTY COUNCIL. Public Health Services. Applications are invited for posts as ASSISTANT COUNTY MEDICAL OFFICERS in the above service as whole-time officers. The duties of the office will include the medical inspection of school-children, maternity and child welfare work, and such other duties, including matters of administration, in connexion with the services as the County Council may direct. The officers appointed may be required to carry out clinical work in hospitals and outpatient departments under arrangements which may be made with the new regional boards and to take refresher or other prescribed courses of instruction. Preference will be given to candidates who have held previous hospital appointments and have had special experience in children's diseases. The possession of a Diploma in Public Health is desirable. The salary will be £800 p.a., rising by £50 p.a. to £1000, together with cost-of-living bonus, and the successful candidates will be eligible for promotion, as vacancies arise, to the position of Senior Assistant County Medical Officer, of whom at present there are 21. Candidates appointed will be required to pass a medical examination and will be subject to the provisions of the Local Government Superannuation Act, 1937.

Forms of application and other particulars may be obtained from the County Medical Officer, Public Health Department, County Offices, Preston, to whom applications should be forwarded not later than 19th October, 1946, accompanied by copies of 3 recent testimonials. All communications must be endorsed "Assistant County Medical Officer."

R. H. ADCOCK, Clerk of the County Council.

County Offices, Preston, September, 1946.

SOUTHAMPTON CHILDREN'S HOSPITAL AND ROYAL HAMPSHIRE COUNTY HOSPITAL. The Committees of the above Hospitals are proceeding to the joint appointment of an HONORARY PÆDIATRICIAN to their Consulting Staffs. The successful candidate will be expected to take outpatient sessions at Southampton and Winchester, and will have charge of a small number of beds at each hospital and be available for consultation. Applications are invited from consultants with qualifications as laid down by the British Pædiatric Association in their recent memorandum (*The Lancet*, 8th June, 1946).

Full particulars as to financial and other arrangements may be obtained from the undersigned, with whom applications should be lodged, with copies of 3 testimonials, not later than 30th September, 1946.

ELLA K. MATTHEWS, Secretary,
Southampton Children's Hospital.

ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY, WIGAN. Applications are invited from registered medical practitioners, including those serving with H.M. Forces, for the position of REGISTRAR to the Orthopædic Department, who will be required to attend the fracture clinics twice weekly, and generally to work under the direction of Mr. F. C. Dwyer, F.R.C.S. Remuneration will be at the rate of £250 p.a.

Applications should be addressed to the undersigned, together with copies of 2 recent testimonials, not later than 30th September, 1946.

A. STANLEY BRUNT, General Superintendent and Secretary.

ROYAL ALBERT EDWARD INFIRMARY AND DISPENSARY, WIGAN. Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant 1st November, 1946. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £300 p.a. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, may apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent as soon as possible to—

A. STANLEY BRUNT, General Superintendent and Secretary.

GLOUCESTERSHIRE JOINT BOARD FOR TUBERCULOSIS, STANDISH HOUSE SANATORIUM, STONEHOUSE, GLOS. Applications are invited for the post of JUNIOR ASSISTANT RESIDENT MEDICAL OFFICER (B2), which will become vacant on 30th September next, from registered medical Men or Women, including R practitioners who now hold A posts. No previous professional experience is necessary. There are at present 250 Beds, including men, women, and children. There is an orthopædic block. Salary £250 p.a., plus bonus, with board, furnished apartments, and laundry in addition. The appointment is for 6 months and may be terminable within that period by 1 month's notice on either side.

Closing date 28th September, 1946.

GUY H. DAVIS, Clerk of the Joint Board.
Shire Hall, Gloucester.

ROYAL BERKSHIRE HOSPITAL, Reading. The Board of Management invites applications for the following Honorary appointments:—

PHYSICIANS (2).	SURGEON.
ASSISTANT PHYSICIAN.	ASSISTANT SURGEON.
ASSISTANT OBSTETRICIAN AND GYNÆCOLOGIST.	ASSISTANT AURAL SURGEON.

ANÆSTHETIST.
PHYSICIAN in charge Dermatological Department.
MEDICAL OFFICER in charge Electrotherapeutic Department.

Candidates for medical appointments must be Fellows or Members of the Royal College of Physicians, London, or Medical Graduates of one of the universities of the British Empire and their names entered on the Medical Register. Candidates for surgical appointments must be Fellows of one of the Royal Colleges of Surgeons or Surgical Graduates of one of the universities of the British Empire and their names entered on the Medical Register. The elected candidates will be appointed for a period ending on the third Tuesday in January, 1947, and will be eligible for re-election. Canvassing on the part of a candidate or on his behalf will disqualify him.

Candidates are required to provide 6 copies of their applications and testimonials which must be addressed to the House Governor and reach him not later than 26th October, 1946. Members of the existing Medical Staff are applicants for each of the above posts. They will not be required to submit testimonials.

By Order, H. E. RYAN, House Governor.

BRADFORD ROYAL INFIRMARY. Applications are invited from registered medical practitioners (Male, single), including practitioners within 3 months of qualification and liable under the National Service Acts, for the following resident appointments:—

HOUSE SURGEON (B2), vacant 8th October, 1946.
HOUSE SURGEON (B2), vacant 17th October, 1946.
HOUSE PHYSICIAN (B2), vacant 1st November, 1946.
HOUSE PHYSICIAN (A), vacant 1st November, 1946.

6 months' appointment. Salary £150 p.a., with full residential emoluments. There are 372 Beds and 11 resident officers.

Applications, stating age, nationality, qualifications, and previous experience, with copies of 3 recent testimonials, should be sent immediately to—

HY. TRUSSON, House Governor and Secretary.

BLACKBURN JOINT HOSPITALS ADVISORY COMMITTEE. Applications are invited from registered medical practitioners holding appropriate qualifications (including those now serving in H.M. Forces) for the appointment of ASSISTANT PATHOLOGIST at the Blackburn and East Lancashire Royal Infirmary and Queen's Park Hospital, Blackburn. The post becomes vacant on 21st September. The appointment is a whole-time one with a commencing salary of £700 p.a., and membership of the Federated Superannuation Scheme.

Applications, with 3 recent testimonials (or names for reference), should be sent at once to—

T. DEWHURST, General Superintendent and Secretary.
Royal Infirmary, Blackburn.

UNIVERSITY OF OXFORD. Applications are invited for the post of GRADUATE ASSISTANT (Grade A) to the Nuffield Professor of Clinical Medicine. Salary £500 to £750 a year, according to experience. Appointment for 1 year in the first instance. Full-time, non-resident. R practitioners cannot be considered unless ineligible for H.M. Forces. The successful candidate will be required to begin his duties as soon as possible.

Applications (3 copies), including the names and addresses of referees, and, if desired, copies of testimonials, should reach the Professor (from whom further particulars may be obtained) at the Radcliffe Infirmary, Oxford, not later than 12th October, 1946.

COUNTY BOROUGH OF HALIFAX. Isolation Hospital, NORTHOWRAM HALL, HALIFAX. Applications are invited from duly qualified medical practitioners, including those now serving in H.M. Forces, for the whole-time permanent appointment of RESIDENT MEDICAL OFFICER. The person appointed will be required to reside at the Isolation Hospital, Northowram Hall, Halifax (98 Beds) and will be given opportunities to familiarise himself with other branches of public health work. Experience in the diagnosis and treatment of infectious diseases is essential and the possession of a Diploma in Public Health is desirable. The salary will be at the rate of £350 p.a., rising by £25 to £550 p.a., together with residential emoluments valued for superannuation purposes at £150 p.a. In addition the person appointed will receive such cost-of-living bonus as may from time to time be paid by the Council. The appointment, which will be subject to the provisions of the Local Government Superannuation Act, 1937, and to the passing of a medical examination, will be terminable by 1 month's notice on either side. The adoption of the interim revision of the Askwith memorandum is at present being considered by the Council.

Applications, stating age, qualifications, and experience, accompanied by copies of 3 recent testimonials, must be endorsed "Resident Medical Officer, Isolation Hospital," and delivered not later than 9th October, 1946, to: W. USHER, Town Clerk.

Town Hall, Halifax, 5th September, 1946.

COUNTY BOROUGH OF DUDLEY. Applications are invited for the post of ASSISTANT MEDICAL OFFICER OF HEALTH (Male) from suitably qualified persons. The Council have adopted the interim revision of the Askwith scale and the salary will be within the range of £650 by increments of £25 to £850, plus bonus of £59 16s. A considerable part of the duties will be in connexion with the school health service but experience in antenatal work or in the treatment of venereal disease is also desirable. Preference will be given to men who have served in H.M. Forces, and possession of the D.C.H. or D.R.C.O.G. will be an additional recommendation.

Applications, together with copies of 2 testimonials or the names of 2 persons to whom reference may be made, should be sent to the Medical Officer of Health at the undermentioned address not later than 5th October, 1946.

A. V. WILLIAMS, Town Clerk.

The Council House, Dudley, 7th August, 1946.

COUNTY BOROUGH OF SOUTHPORT. Public Health Department. Applications are invited from qualified and registered Female medical practitioners for the whole-time appointment of ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER. Practitioners serving in H.M. Forces are invited to apply. Candidates should be under 45 years of age and should possess the D.P.H. qualification and be recognised or eligible for recognition by the Minister of Education for the ascertainment of educationally subnormal children. The successful candidate will work under the general supervision of the Medical Officer of Health who is also the School Medical Officer. The salary payable is in accordance with the interim revision of the Askwith memorandum—i.e., £650 p.a., rising by annual increments of £25 to a maximum of £850 p.a., together with cost-of-living award, and the commencing salary will be fixed within this grade according to the qualifications and experience of the person appointed. A motor-car allowance of £75 p.a. is also payable. The post is subject to the Local Government Superannuation Act, 1937, and the successful candidate will be required to undergo a medical examination.

Forms of application can be obtained from the Medical Officer of Health, Public Health Department, 2, Church-street, Southport. Completed application forms, endorsed "Assistant Medical Officer of Health and School Medical Officer," together with copies of 3 recent testimonials, to be sent to the undersigned so as to reach him not later than the first post on 12th October, 1946. Canvassing, directly or indirectly, will be a disqualification.

R. EDGAR PERRINS, Town Clerk.

Town Hall, Southport, 10th September, 1946.

COUNTY BOROUGH OF ROTHERHAM. Oakwood Hall SANATORIUM. Applications are invited from qualified medical practitioners of either sex (unmarried) for the appointment of TEMPORARY ASSISTANT MEDICAL OFFICER (B1) at a salary of £350 p.a., together with board, residence, and laundry, and a temporary cost-of-living bonus in accordance with the Council's scale. The Council has under consideration the interim revision of the Askwith memorandum and when that scale is approved the salary will be revised accordingly. The post includes duties at the Isolation Hospital or in other departments as required and will be limited to a period of 12 months. The post will be subject to 2 months' notice on either side at any time and to the Council's regulations relating to sick pay and service conditions. The successful candidate will be required to pass a medical examination for superannuation purposes. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Forms of application may be obtained from the Medical Officer of Health, Municipal Offices, Rotherham. Completed applications must be returned to the undersigned, suitably endorsed, not later than 10th October, 1946.

JOHN S. WALL, Town Clerk.

Municipal Offices, Rotherham, 12th September, 1946.

THE UNIVERSITY OF SHEFFIELD. Applications are invited for the post of RESEARCH ASSISTANT for cancer research in the Department of Pathology. Applicants should have had some experience of biological research methods. A medical qualification is not essential but otherwise some special experience in histology, tissue culture, biochemistry, genetics, viruses, or in any branch of cancer research is desirable. Salary £600–£800, according to qualifications and experience.

Applications (4 copies) should be sent to the undersigned, from whom further particulars may be obtained, not later than 19th October, 1946. A. W. CHAPMAN, Registrar.

ROYAL SHEFFIELD INFIRMARY AND HOSPITAL. The Royal HOSPITAL UNIT. Applications are invited from registered medical practitioners, Male and Female, for the following (A) appointments:—

EAR, NOSE, AND THROAT HOUSE SURGEON, vacant now.

ASSISTANT CASUALTY OFFICER, with orthopædic duties, vacant 1st October, 1946.

ASSISTANT CASUALTY OFFICER, vacant 1st October, 1946.

2 HOUSE SURGEONS, vacant 1st October, 1946.

Salary is at the rate of £80 p.a., with full residential emoluments. A bonus of £20 will be payable after 6 months' satisfactory service and a further bonus of £10 after a second 6 months' satisfactory service. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months—otherwise may be extended.

Applications and copy testimonials to be forwarded immediately to— P. N. GLASS, General Superintendent at The Royal Hospital, Sheffield, 1.

ROYAL SHEFFIELD INFIRMARY AND HOSPITAL. The Royal HOSPITAL UNIT. Applications are invited from registered medical practitioners, Male or Female, for the appointment of CLINICAL ASSISTANT (B1) for anæsthetics, vacant 1st October. The appointment, in the first instance, is for 6 months and is renewable for a further 6 months. Salary is at the rate of £450 p.a., non-resident, or £350 p.a., with full residential emoluments. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and ineligible for H.M. Forces, are invited to apply.

Applications and copy testimonials to be forwarded immediately to— P. N. GLASS, General Superintendent, at The Royal Hospital, Sheffield, 1.

E.M.S. NEUROSURGICAL UNIT, Stoke-lane, Stapleton, Bristol. RESIDENT HOUSE SURGEON (B2) (Male or Female) required to begin duties on 15th October. Salary £200 p.a., with full residential emoluments. R practitioners holding A posts may apply, when appointment will be limited to 6 months.

Applications, with 3 testimonials, to be made to the Regional Adviser in Neurosurgery at the above address.

NORTHAMPTON GENERAL HOSPITAL. (410 Beds.) The Board of Management invites applications from registered medical practitioners, including those at present serving with H.M. Forces, for the appointment of TEMPORARY HONORARY SURGEON. Candidates must be Fellows of the Royal College of Surgeons of either England or Edinburgh, and must have had considerable experience in general surgery and special experience in urology.

Applications, with copies of 3 testimonials, should be addressed to the Superintendent, and should be received on or before 2nd October, 1946.

THE NOTTINGHAM AND NOTTS RADIOTHERAPEUTIC CENTRE AND THE NOTTINGHAMSHIRE COUNCIL OF THE BRITISH EMPIRE CANCER CAMPAIGN. Applications are invited for the post of ASSISTANT RADIOTHERAPIST to the Nottingham and Notts Radiotherapeutic Centre at the Nottingham General Hospital (affiliated with the National Centre at Sheffield). The commencing salary will be from £800 to £1000 p.a., according to qualifications and experience, with participation in a superannuation scheme. The post is a full-time one, and the Assistant Radiotherapist will act as Deputy to the Radiotherapist.

Applications should be received by the undersigned as soon as possible, from whom full particulars can be obtained.

HENRY M. STANLEY, House Governor and Secretary.

KENT COUNTY MENTAL HOSPITAL, Chartham Down, near CANTERBURY. Applications are invited from registered Male medical practitioners for the appointment of SECOND ASSISTANT MEDICAL OFFICER (B1) at the above Hospital. Salary £455 p.a., rising by £25 p.a. to £555, plus full residential emoluments valued at £209 p.a. Preference will be given to those with previous experience in psychiatry, and an additional £50 will be paid to holders of the D.P.M. An additional cost-of-living war addition of £29 18s. will be paid. There is no accommodation for a married man. The appointment will be subject to the provisions of the Asylums Officers' Superannuation Act, 1909.

Applications, accompanied by copies of 3 recent testimonials, must be sent to the Medical Superintendent by 30th September, 1946.

KINGSTON UPON HULL CORPORATION HEALTH DEPART-MENT. Applications are invited for the post of ASSISTANT MEDICAL OFFICER OF HEALTH (Woman) for maternity and child welfare from duly qualified medical Women of not less than 3 years' standing in their profession. Candidates must have had experience in children's diseases and in midwifery. The Diploma in Public Health, or its equivalent, will be considered an additional qualification for the office. Salary £750 p.a., rising by annual increments of £25 to £850 p.a., plus cost-of-living bonus.

Application forms, &c., may be obtained from, and should be returned duly completed to, the Medical Officer of Health, Guildhall, Kingston upon Hull, not later than 10 A.M. on Monday, 30th September, 1946.

PONTEFRACT GENERAL INFIRMARY AND THE HYDES HOSPITAL. (112 Beds.) Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE PHYSICIAN (A), vacant immediately. Salary £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be sent to—

D. J. RICHARDS, Secretary-Superintendent.

CHELMSFORD AND ESSEX HOSPITAL. The General Committee of Management invite applications for the post of HONORARY NEUROLOGIST.

Further particulars regarding this post can be obtained from— R. G. MORRISH, House Governor and Secretary.

ROYAL HALIFAX INFIRMARY. (283 Beds—Resident Medical Staff, 6.) Applications are invited for the following posts:—

RESIDENT SURGICAL OFFICER (B1) (Male), vacant 15th October, 1946. Salary £325 p.a., with residence, board, and laundry. Preference given to applicant holding higher qualifications. R practitioners holding B2 posts, also those holding B1 and ineligible for H.M. Forces, may apply.

RESIDENT ANÆSTHETIST (B2) (Male), vacant 1st October, 1946. Salary £250 p.a., with residence, board, and laundry. R practitioners holding A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, previous experience, and nationality, together with testimonials, should be sent to the Secretary immediately.

2nd September, 1946.

ROYAL HALIFAX INFIRMARY. (283 Beds—Resident Medical Staff, 6.) A vacancy occurs for CASUALTY OFFICER (B2), in charge of fracture clinic, to commence duty at once for a period of 6 months. Salary £250 p.a., with full residential emoluments.

Applications from registered medical practitioners (Male), including those from R practitioners holding A posts, stating age, qualifications with dates, nationality, and present post, accompanied by copies of 3 recent testimonials, should be sent immediately to: R. W. RANSON, Secretary.

16th September, 1946.

ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL, SOUTHAMPTON. (256 Beds.) Applications are invited from registered medical practitioners, Male, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (A). The appointment will be for a period of 6 months. Salary is at the rate of £175 p.a., with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

FRANK JENNINGS, House Governor and Secretary.

9th September, 1946.

ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL, SOUTHAMPTON. (256 Beds.) Applications are invited from registered medical practitioners, Male, for the appointment of RESIDENT ANÆSTHETIST (B2). The appointment is recognised for D.A. The salary will be at the rate of £225 p.a., with full residential emoluments. R practitioners holding A posts may apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

FRANK JENNINGS, House Governor and Secretary.

9th September, 1946.

WARWICKSHIRE AND COVENTRY JOINT COMMITTEE FOR TUBERCULOSIS. Applications are invited from qualified and registered medical practitioners, Men or Women, for the post of TEMPORARY ASSISTANT TUBERCULOSIS OFFICER. The person appointed must be prepared to devote the whole of his or her time to the duties of the office, and must have had experience in the diagnosis and treatment of tuberculosis. The salary will be at the rate of £770 p.a., plus a cost-of-living bonus, rising to £805 p.a. after 12 months' satisfactory service, together with motor-car allowances in accordance with the Joint Committee's scale, and other reasonable travelling expenses. The application of the interim revision of the "Askwith" memorandum is under consideration by the Joint Committee.

Forms of application and statement of the duties and terms of the appointment can be obtained from the undersigned. Applications, marked "Temporary Assistant Tuberculosis Officer," with copies of not more than 3 recent testimonials, must be received by me not later than first post on Monday, 7th October, 1946.

L. EDGAR STEPHENS, Clerk of the Joint Committee.

Shire Hall, Warwick, 11th September, 1946.

ROYAL VICTORIA HOSPITAL, Belfast. Resident House Surgeon required for the Hospital's Neurosurgical Unit. The appointment will be for a period of 1 year, commencing 1st November, 1946. Salary £175 p.a. Candidates must have at least 1 year's hospital experience since qualifying.

Applications, together with copies of testimonials, should be submitted to the Honorary Secretary.

By Order, W. MCKINNEY, Honorary Secretary.

ROYAL VICTORIA HOSPITAL, Belfast. Surgical Registrar (non-resident) required for the Hospital's Neurosurgical Unit. The appointment will be for a period of 1 year, commencing 1st November, 1946. Salary £450–£550 p.a., according to experience.

Intending candidates for the Royal College of Surgeons Examination are invited to submit applications, together with copies of testimonials, to the Honorary Secretary.

By Order, W. MCKINNEY, Honorary Secretary.

10th September, 1946.

PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, September 21, 1946.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

BANBRIDGE DISTRICT HOSPITAL. (230 Beds.) The Committee of Governors of the above-named Hospital invite applications for the position of Full-time MEDICAL OFFICER. The person appointed must possess the qualifications of Fellowship of one of the Royal Colleges of Surgeons or Master of Surgery of a university in Great Britain or Ireland. The salary will be at the rate of £800 p.a., and the officer appointed will be allowed to act in a consultative capacity and as an operating surgeon. The duties of the office are those prescribed in the District Hospitals Order, 1918, or any order amending same, and the person appointed will require to comply with the rules and regulations from time to time prescribed by the Committee of Governors and the Ministry of Health and Local Government for Northern Ireland. The appointment, which may be terminated at any time on 3 months' notice, is a temporary one, but the person appointed will have the opportunity of applying when the Governors are in a position to invite applications for a permanent Medical Officer. The person appointed may be required to reside in the town of Banbridge. Board and accommodation will not be provided by the Governors. The Governors will defray at least part of the travelling expenses incurred should an interview be requested.

Applications, stating age, qualifications, and particulars of previous experience, and accompanied by diploma and copies of 3 recent testimonials, will be received by the undersigned up till the hour of 12 o'clock NOON on Saturday, 5th October, 1946. Other things being equal, preference will be given to persons who have served in H.M. Forces, and the appointment will be subject to the approval of the Ministry of Health and Local Government for Northern Ireland.

J. C. PANTRIDGE, Clerk to Governors.

Hospital Offices, Banbridge, Co. Down, 10th September, 1946.

THE MALACCA AGRICULTURAL MEDICAL BOARD, Malacca, MALAYA. A registered medical practitioner is required by The Malacca Agricultural Medical Board, a body constituted under an ordinance of the Malayan Union Government for the provision of a medical and antimalarial service to rubber estates situated in the Malacca district. Details of the appointment are as follows:—

Terms of Service: The successful candidate will be required to commence duty in Malacca on or about 1st January, 1947, and to sign in the first instance a 4-year contract. The cost of a steamer passage to Malaya for the successful candidate (and his wife) will be paid by the Board. In the event of the practitioner determining the contract before completing 2 years' service from the date of commencing duty in Malacca, he will be required to refund the outward passage moneys paid by the Board proportionately to the extent by which the period he actually serves with the Board falls short of 2 years.

Salary: The commencing salary will be Straits $950 (nine hundred and fifty Straits dollars), with annual increments of Straits $25 (twenty-five Straits dollars) per mensem. The Straits dollar is equivalent to 2s. 4d. in British currency and, at the present time, to approximately 2s. 10d. in Australian currency.

Cost-of-living Allowance: A special cost-of-living allowance of Straits $100 (one hundred Straits dollars) per mensem will be paid initially. Such allowance will be subject to review by the Board quarterly in the light of current conditions.

Provident Fund: The successful candidate will be required to contribute monthly to the Board's Provident Fund at the rate of 10 % of substantive salary (excluding cost-of-living allowance). Contributions at the same rate will be made by the Board.

Transport: The Board will at its discretion either provide suitable transport or, in lieu thereof, pay a reasonable travelling allowance.

Accommodation: Free quarters furnished with heavy furniture will be provided.

Termination of Service: The contract will be determinable by either party at 3 months' notice in writing.

Leave: On the completion of 4 years' service, 8 months' leave on full pay at the rate of Straits $1025 (one thousand and twenty-five Straits dollars) per mensem and a homeward steamer passage for the practitioner (and his wife) at the Board's expense will be granted. In the event of the practitioner returning to the Board's service, a return passage will be provided.

The practitioner's wife is not necessarily required to travel at the same time as the practitioner, but the Board will provide only one outward and homeward passage for his wife in respect of each contract of service entered into by the practitioner. The practitioner will in addition be entitled to 2 weeks' casual local leave on full pay during each year of service; the right to such local leave, if not taken in any given year, will not be cumulative.

Qualifications: Candidates should hold a Diploma in Public Health or possess extensive practical experience in this field. Other things being equal, preference will be given to candidates who possess previous experience of antimalarial work in the tropics and who are not over 35 years of age.

General: Applications, giving details of qualifications, age, and experience, together with copies of not more than 3 testimonials, should be forwarded by air mail to SIME, DARBY & CO., LTD., Secretaries, The Malacca Agricultural Medical Board, 4, Fort-road, Malacca, Malaya. The closing date for receipt of applications in Malacca is 15th November, 1946.

The candidate selected will, prior to sailing, be required to provide a medical certificate (signed by a doctor nominated by the Board) of fitness for service in the tropics.

GOVERNMENT OF IRAQ. Professor of Bacteriology required for the Royal College of Medicine, Bagdad, for 3 years in the first instance but contract for a shorter period would be considered. Salary Iraq Dinars 150 a month, plus high cost-of-living allowance I.D. 24 a month (I.D. 1 = £1 sterling). Free first-class passages. Provident fund. Candidates must be British subjects. Practitioners now serving in H.M. Forces may apply.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/16867, on both letter and envelope.

AUCKLAND HOSPITAL BOARD, New Zealand. Applications are invited from suitably qualified medical practitioners for the position of ORTHOPÆDIC REGISTRAR for the Auckland Hospital. Preference will be given to an applicant with overseas qualifications and experience, and a Fellow of one of the Royal Colleges. The appointment is full-time. Commencing salary £NZ.1000 p.a., living out.

Conditions of appointment and form of application may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London. Applications close with the undersigned at the Office of the Board, Kitchener-street, Auckland, New Zealand, at NOON on Friday, 22nd November, 1946.

R. F. GALBRAITH, Secretary.

AUCKLAND HOSPITAL BOARD, New Zealand. Applications are invited from suitably qualified medical practitioners for the position of ASSISTANT NEUROSURGEON for the Neurosurgical Unit, Auckland Hospital. Preference will be given to applicant holding the degree of F.R.C.S. The appointment is full-time. Commencing salary will be at the rate of £NZ.1000 p.a., living out.

Conditions of appointment and form of application may be obtained from the Office of the High Commissioner for New Zealand, 415, Strand, London. Applications close with the undersigned at the Office of the Board, Kitchener-street, Auckland, New Zealand, at NOON on Friday, 15th November, 1946.

R. F. GALBRAITH, Secretary.

Harley-street.—Newly decorated professional Suite available, comprising flat (3 bed., 3 rec., K. and B.), with additional Consulting-rooms.—BLAKE & Co., 106, Mount-street, W.1 (GRO 3761).

Secretary-Receptionist, well educated, ex-W.A.A.F., medical secretarial experience, shorthand, typing, requires post, preferably with London Specialist. If other than London area, willing live in. Travel interview. Free October.—Address, No. 573, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Secretary-Shorthand-Typist (experienced) requires post. Salary £9 per month if resident. Town or country.—Apply, address, No. 575, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Doctors, Male and Female, required for Locums and Assistantships. Vacancies for Hospital Locums and Ships' Surgeons. Practices and Partnerships for disposal.—Write: A SHAW, Medical Transfer Agent, Premier Buildings, 88, Church-street, Liverpool.

Convalescents and suitable patients requiring psychological supervision (5 only) received in psychiatrist's house. 10 acres of grounds on Thames bank. From 15 guineas weekly.—Weir Cottage, Chertsey, Surrey. Tel.: 2135.

Medical Country Practice for disposal.—Apply: Medical Officer, Longburgh, Burgh by Sands, Carlisle.

To retiring Practitioners south of the Tweed.—Would Doctor in country or country town sell his house and practice to ex-R.N.V.R. London Graduate? Income about £1500 or less. Capital available.—Address, No. 574, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

South Wales, Half Share for Sale at 1½ years' purchase. Average income £4000. House available.—Address, No. 555, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Provincial Mental Licensed Home for Sale (40 Beds) and Freehold Estate of 12 acres. Would suit Doctor specialising in mental diseases. Capital required approximately £30,000. Owner retiring. Some financial arrangements can be made. Solicitors only.—AGAR, BATES, NEAL & Co., 106, Edmund-street, Birmingham, 3.

Songhurst and Rickard, Consultants to the medical profession on all business matters. Personal attention given by qualified Principals. Specialists in Residential Property, Practices, Partnerships, Nursing-homes, Valuations for Probate or Sale, Inventories and Reports, Mortgages, &c. The whole country covered.—15, Castle-street, Exeter. Phone 2543.

18 h.p. Talbot, black Sports-Saloon in perfect condition, for Sale by owner-physician. For inspection, &c., please communicate with Mr. GEORGE SILVER, 18, Cleveland-avenue, Hampton, Middlesex, where the car is garaged.

Zeiss large research Microscope with fine focusing situated in tilting axis, black and chromium, large diameter body tube, detachable body, large square built-in mechanical stage G, triple nosepiece, Zeiss aplanatic condenser 1·4, oculars ×5, ×10, objectives 8, 40, 100 oil-imm., cabinet. £150.

Zeiss laboratory Microscope, jug handle stand, fine focusing both sides, circular fixed stage, rackwork substage, Abbé condenser, oculars no. 2, no. 4; objectives Zeiss 16 mm., 4 mm., 3 mm., 1/12th oil-imm., cabinet is shabby. £42 10s.

Wallace Heaton high-intensity Microscope Lamps, with built-in transformer. £6 15s.

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